The Chemical Age

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Contents

PAGE

EDITORIAL NOTES: The Congress and After; The I.G. and the Bergius Process; Rights of External Students; Vertical Retorts and High Grade Gas; Secret Processes versus Patents 97
British Chemicals in Imperial Markets 100
The West African Palm Oil Industry 101
The London Congress of Chemists: Annual Dinner of the Society; Chemistry and Economics; Discussions on Particle Size, Solid Smokeless Fuel, Hormones, and Power Alcohol 102
Result of Bradford Dyers' Action 111
Colour Users' Association: Annual Meeting 112
Chemical Matters in Parliament 113
From Week to Week 114
References to Current Literature 115
Patent Literature 116
Weekly Prices and Market Reports 119
Company News; New Chemical Trade Marks; Chemical Trade Inquiries; Tariff Changes 124
Commercial Intelligence; New Companies Registered 126

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Congress and After

THE noise of the battle is stilled, and after a week spent on the London front the chemists have resumed the even tenor of their ways—the more fortunate ones to taste the joys of the countryside and the sea, the less fortunate to resume the routine of their duties. The Congress had an excellent press, and the public was reminded, in a number of ways, that chemistry touches its life at many important points. To the profession itself the Congress provided an opportunity of taking stock of recent advances in a number of directions. Where such a wealth of material exists from which to choose, it seems almost invidious to pick on special points for mention. The papers read at the discussion on "The Influence of Particle Size in the Paint and Rubber Industries" must have been a revelation to any superior people who regard paint and rubber chemists as low-brows. They provided yet another instance of the conquering advance of science to every corner of human activity. In this connection we observe that the Research Association of the British Paint, Colour and Varnish Manufacturers seems to be about to appoint a director of research. The Association is to be congratulated on making this step towards the consummation of its ends. The "Power Alcohol" meeting is likely to do a deal of good in focussing attention on a very important matter. The Promised Land is not yet reached; but work of this kind is always liable to provide us sooner or later with a really sensational surprise. Much has already been done; and it is likely that as our pure scientific knowledge of cellulose and the sugars and the relation between them is placed on a more and more solid basis, the subject will develop until it makes that bound forward which has occurred in so many other cases. It may be that within ten years this field of activity will provide us with the next romance of technical science.

The Fuel Group has held its first meeting. It was gathered together under the shadow of one of the recurrent attacks of fever to which the coal industry has of late been subject. The meeting should serve as a reminder that ultimately the last word in this industry rests with the chemist and the engineer. Reconstruction and rearrangement will be useless unless they provide fully for extensive research and its application. Looking at some of the appallingly difficult problems which confront the Fuel Section, it is not surprising that the coal industry is in a state of unrest. The marvel is that without any proper scientific organisation it has survived so long.

The I. G. and the Bergius Process

INTERESTING developments, the ultimate course of which it is at present difficult to foresee, seem to be taking place quietly and rather secretively in connection with the Bergius process for the hydrogenation of coal and lignites. It seems now to be self-evident that the Bergius patents have definitely passed into the control of the German Dye Trust, and that Dr. Bergius is actively engaged in assisting this undertaking to develop his inventions on a large commercial scale. The administration of the I. G. has lately gone so far as to confirm that negotiations have been proceeding with the Standard Oil Company of America; but the basis of the discussions does not seem to be in connection with the acquisition of the Bergius patents with a view to production in America. The question involved is, rather, a commercial one, relating to the areas of marketing the synthetic product. In other words, the Standard Oil Company would appear anxious to conclude some agreement whereby competition would be eliminated from certain of its markets. The I. G. admits that a fundamental basis

for an agreement of the kind has been found, but it refuses to disclose any details.

This anxiety of the Standard Oil Company as to the possible incidence of competition in the near future, can only lead to the assumption that the reports which have long been current as to the low cost of producing a synthetic liquid hydrocarbon fuel by the Bergius methods, are by no means devoid of foundation. One has to bear in mind that at the present time, the resources in highly trained staffs, money, and specialised apparatus of the Badische concern are concentrated on the solution of this highly important problem, and that the indefatigable Dr. Bosch is seldom baulked of the end he has in view. Obviously it is recognised in Germany to-day that the outlook for dyestuffs is limited in the extreme, that a heavily capitalised trust cannot possibly live on dyestuffs alone, and that the future lies in producing and marketing a product for which there is little likelihood of the supply exceeding the demand. The main question which must enter the head of the English fuel technologist is as to whether the laboratory and semi-technical results of the Bergius methods have really been definitely and successfully translated to a practical commercial scale. Information which we have lately received seems to point to the fact that not only has this been done, but that a great deal more progress has been made than has ever been disclosed by patent specifications or published information. In other words, the time-honoured ruse of the German—and possibly a quite legitimate one—is being resorted to, namely, the direct withholding from specifications of some of the salient features so as to render them of little use to those in other countries who may have predatory intentions.

Rights of External Students

THE University of London has performed such valuable services in the past in the cause of scientific education especially through its external side, that any change intimately affecting its constitution is a matter of considerable importance to the scientific world generally. A Bill is now before Parliament giving effect to the recommendations of the Majority Report of the Departmental Committee on the University of London. Amongst these by far the most important consists in the entire remodelling of the governing body of the University.

At present, the Senate, the main governing body, consists of the Chancellor, who does not attend, and 55 others, who are made up of 17 Graduates of Convocation, 16 representatives of Academic teachers, and 22 others nominated by various bodies, such as the Crown, Colleges of Physicians and Surgeons, the London County Council, the Inns of Court, etc. The third group forms a valuable section of neutral opinion and frequently provides some of the most distinguished members of the Senate. This body is to be replaced by the "Council of the University," and is to consist of the Chancellor, Vice Chancellor and Chairman of Convocation; 4 persons appointed by the Crown; six persons appointed from their own number by the Senate; two by the London County Council and one co-opted by the remainder of the Council. The new Senate, which is to be a purely advisory body, is to consist of the Chancellor, Vice Chancellor and Chairman of Convocation, 16 representatives of Graduates of Convocation and 25 academic and scholastic representatives; they may also co-opt five more members, but the old third class nominated from outside bodies is abolished.

There is a widespread feeling among graduates of the University that if and when the new conditions come into force, the interests of graduates, especially of external graduates, will be in considerable danger of neglect, as the constitution designed for the University tends to reduce to a negligible figure the representation which is the sole defence of external interests. It cannot be doubted that a governing body unsympathetic to the external side could attenuate external activities by the simple expedient of refusing money for their development. It is significant of the feeling in the University that the present Member of Parliament, Dr. E. G. Little, was returned quite independently of any political party, for the sole purpose of opposing the recommendations of the Haldane Report, which were very similar to those embodied in the present Bill. We understand also that both the Senate and Convocation have petitioned the President of the Board of Education to be allowed to present to him an agreed scheme of reforms, but the Government has decided to press forward with the Bill.

Vertical Retorts and High Grade Gas

THE Fuel Research Board continues in a quiet and unobtrusive manner to carry out its valuable work in connection with the utilisation of fuels, and at intervals one is reminded of this fact by the publication of technical papers which give an admirably detailed and lucid survey of some particular problem which has been selected for attack. The latest publication (Technical Paper No. 15) relates to an investigation that was conducted at the experimental station at East Greenwich at the request of the South Metropolitan Gas Company, the object in view being to ascertain the possibility of producing, in continuous vertical retorts, gas and coke of the same nature as the company were obtaining in their horizontal and inclined intermittent retorts. It will be recalled that in the matter of "declared calorific value," the South Metropolitan Gas Company are almost unique in their selection, providing a high grade gas of 560 B.Th.U. per cubic foot, as against a general standard ranging from 450 to 500 B.Th.U. This point is of interest when it is recalled that modern carbonisation in vertical retorts depends for its superiority over older methods largely upon the ease and effectiveness with which the process of "steaming" is applied; but that in such cases the calorific power of the gas is decidedly lower than the declared standard under which this particular company operates. The point at issue, therefore, was as to whether the vertical retort is suitable when a high-grade gas is demanded; and, if so, does it still retain the advantages which it has proved to possess when a lower quality gas is produced?

It is pointed out that the data obtained by the gas company, being yielded by a commercial plant, are

not necessarily so accurate as those obtained at the research station. Nevertheless, when due allowance is made for varying conditions, they offer a very interesting comparison of the carbonising possibilities of two entirely different systems. A very complete set of tabulated results is included in the report, and a survey of these indicates that, for gas of approximately equivalent calorific power, the older inclined retorts gave a superior volume yield of gas per ton of coal, the difference ranging between 300 and nearly 800 cubic feet. So far as the coke yield was concerned, there was little difference between the systems; but as regards tar—if the results, of which some doubt is expressed, are accurate—there is an immense advantage in favour of the inclined retorts. These facts are particularly instructive, for the reason that in these days when the vertical retort seems to be carrying all before it, it does appear that, purely from the point of view of carbonising results, it is inferior to the older methods when a really high quality gas is required.

Secret Processes *versus* Patents

When the chemical manufacturer evolves a new device or an improved process the problem with which he is immediately faced is whether his invention should be protected by patent or whether it should be worked secretly? Twenty or thirty years ago the answer was very different from the decision usually taken to-day. Perhaps in those days processes could more easily be kept secret than in these more strenuous times, and probably workmen were less capable of appreciating the operations they performed. If so, it is possible that with the increase of mass-production methods and the consequent intensification of specialisation there may be a return to the old neglect of patent protection, since no workman, nor even a small group of workmen, can in these circumstances know enough of a process to betray it.

The taking out of a patent is a bargain, in which there is a *quid pro quo*. In return for a monopoly for a limited period the patentee takes the public into his confidence and divulges the details of his invention. And in this way, it ought to be remembered, the public gains more than the mere right to use the invention after the expiration of the monopoly period. There is often a real addition to the sum of human knowledge, which has its result in the further development of the invention, and even in the making of apparently unrelated discoveries. Fresh minds are attracted to the problem and general progress is accelerated. It is a matter of common experience that inventors (and especially chemical inventors) find their most fertile sources of inspiration in patent literature. A return to the old habit of secret processes, if it became feasible again, would thus be a doubly retrograde step. The perfection of an invention would stop short, limited by the inventive capacity of the original discoverer, instead of being improved upon and developed by a hundred inventive minds. Further, a valuable source of inspiration would be dried up.

At first glance, the prospect of starting a hundred rival inventors on the track of our own discoveries seems to be a decisive reason for not patenting our inventions. In the case of minor improvements upon known processes this may be a sound argument, and indeed we have often wondered why such patents are ever sought. Let us suppose that "A" discovers a novel reaction and in his patent he describes it as taking place most easily at 200° C. "B" comes along and after a few experiments finds that 300° is the optimum temperature. If "B" patents his improvement he simply makes a present of his knowledge to "A" and the general public; for in any case he must obtain a licence from "A" in order to work the reaction at all. We have taken a somewhat extreme example, but there would be no difficulty in finding parallel cases in actual experience. The futility of "B's" patent is further evident when we consider how he is to enforce his rights. Infringement is ordinarily a difficult thing to prove, and in such a case as this it would be practically impossible.

It is very different with "pioneer" patents, that is, patents for inventions which break new ground. The invention cannot usually be kept secret, for the same circumstances which enable infringement in these cases to be more easily proved also enable competitors to discover the secret of the invention as soon as the product is on the market. The patentee has protection for a year or more before his invention is published, and this time is ordinarily sufficient for him to develop the discovery as far as he is able. Subsequent improvements by other inventors add to the value of his original patent (for they may only be worked by his licence), and may even suggest to him further developments which he would otherwise have neglected. During the war the methods of chemical industry were revolutionised in several ways, not the least important among them being the breaking down of the impermeable barriers which divided the industry into innumerable watertight compartments. Inspectors and assistant inspectors on behalf of the Ministry of Munitions visited the individual factories, in effect pooling the knowledge and experience of the whole industry. Much emphasis was laid upon secrecy, but it was a secrecy against the enemy, and not amongst ourselves. The patent system, it seems to us, provides a means to a similar end. It safeguards individual rights and gives opportunity for an invention to earn a suitable reward; while at the same time it increases general knowledge and inspires further invention.

Books Received

An Introduction to Surface Chemistry. By E. K. Rideal. London: Cambridge University Press. Pp. 336. 18s.

The Chemistry and Examination of Edible Oils and Fats. By G. D. Elsdon. London: Ernest Benn, Ltd. Pp. 521. 45s.

The Calendar

Aug. 4–11	**British Association for the Advancement of Science. Annual meeting.**	**Oxford.**
Sept 1 to 4	Institute of Metals: Autumn meeting.	Liége, Belgium.
6 to 11	American Chemical Society: 50th Anniversary.	Philadelphia, Pennsylvania.
20–24	**Chemists' Exhibition.**	**St. Andrew's Hall, Glasgow.**
26 to Oct. 3	Société de Chimie Industrielle: Sixth Congress of Industrial Chemistry.	Brussels.

British Chemicals in Imperial Markets

The Effects of International Competition

THE British chemical industry effects a trade on its export side alone of £30,000,000 per annum, and this is made up as to two-thirds by pure chemicals and the remaining one-third by oils, fats, and resins. This total is by no means stationary year by year, but has shown a gradual tendency to increase during the last three annual periods and progress is being built up on better buying in numbers of overseas markets. Some of the leading developments are occurring in markets throughout the Empire, and by reason of the natural tendency of these countries in particular to look for their chemical requirements to Great Britain it is not surprising that in many exported chemical products a large proportion of the whole is shipped to Imperial markets. Looking at this position from the other side it is also apparent that British chemicals bulk largely in the chemical imports of such countries as Australia, New Zealand, South Africa, and India.

Competition in Canadian Supplies

There is, however, Canada as the one large Empire market which presents a striking exception to this general rule. Some reason for this is doubtless to be found in the proximity of the United States as a rival supplier, but it is well to realise that although when dealing in grand totals our figures seem low in comparison with those of U.S.A., nevertheless certain of our products have a good hold in this Dominion, and thus the British output is by no means obscured. Some bright examples in this connection are to be seen in recent Canadian statistics. This Dominion is a useful market for citric acid, and during the last complete fiscal year 1925-26 imported in all citric acid having a value equivalent to £27,000. Of this no less than £19,000 worth represented the amount taken from Great Britain, while £6,000 worth only were the combined supplies derived from the United States, Holland, and Italy. American manufacturers were again our competitors with cresylic acid, but sent only about £200 worth as compared with £2,100 worth from this country. When we turn fo figures for other acids, however, the United States suppliers show as the dominant factor.

This is the case with boric, oxalic, stearic and tartaric acids, for which the combined value of Canadian receipts amounted to £53,000, and of which less than 8 per cent. or £4,000 was imported from Great Britain.

In painters' colours of practically all descriptions there is greater activity on our part and British manufacturers get a fair share in what constitutes a valuable market for these lines. Litharge imports, for instance, into Canada have now reached £39,000, and of this 29 per cent. came from Great Britain. Practically all white lead comes from this country and 44 per cent. of red lead out of total imports of £16,000, whilst in the large lithopone receipts, which were worth in all £112,000, the British supplies were close on 30 per cent. Zinc white is an exception among painters' colours, as our supplies, amounting to £9,500, are only 6 per cent. of Canadian requirements. These figures in the Canadian trade will at least serve to indicate that altogether this Dominion constitutes a highly important chemical market, and even though British manufacturers are supplying almost £600,000 per annum this only represents about one-quarter of the total imports. The buying ability offers an effective demand, but stronger competition here requires a keener effort to obtain business than in other Dominions.

Actually the New Zealand market, with its much smaller industrial and agricultural activity, is a larger market from our point of view than Canada, whilst another Empire area, viz., India, is at least three times as large a buyer of British chemicals.

Our Monopoly of Indian Requirements

India is worthy of attention as having shown itself a progressive chemical market of recent years. Taking the four latest fiscal periods the chemical imports from all sources into India have been rupees 19,088,000 in the twelve months of 1921-22, rupees 20,169,000 in the succeeding year, followed by rupees 20,474,000, and finally in 1924-25 a total of rupees 20,883,000. This means a net expansion of 9 per cent. in buying over these periods in a market worth approximately £1,700,000, and from the statistics it is clear that nearly 65 per cent. of all the trade is held by manufacturers in this country, whilst it is also satisfactory to realise that we are keeping pace with the increase in business.

In the largest group of Indian imports, viz., that of soda compounds, for which alone the total buying is close on £1,000,000, more than 90 per cent. was British, and our almost complete monopoly in this direction is enhanced by the fact that the remaining small percentage accrued to a number of rival suppliers.

In this connection it is well to see how the British supplies stand for individual sodium products. Thus the bichromate imports of 15,200 cwts. in 1924-25 were taken to the extent of 11,100 cwts. from Great Britain and 2,900 cwts. from U.S.A., with a small figure of 885 cwts. from Germany. The bicarbonate imports were 112,000 cwts. of which 110,000 cwts. were British and 1,600 cwts. from Germany. Caustic soda receipts into India were 109,000 cwts. with the British proportion at 90 per cent. and the American at 8 per cent. Next the cyanide came exclusively from this country and the carbonate to the extent of 726,000 cwts. out of a total of 857,000c wts., Germany, our main competitor here, sending 32,000 cwts., whilst over 70 per cent. of the silicate was bought from Great Britain, with 22 per cent. from Germany and 5 per cent. from Belgium. Keener competition is shown in the trade for borax, where the total imports of 9,564 cwts. were split up into 3,500 cwts. from Great Britain, 5,400 from Germany and the remainder from Belgium. The big instance, however, where a competitor tops the market is that of sodium sulphide, where German supplies of 22,300 cwts. form 66 per cent. of the whole import trade and are more than five times as large as our own. For this product the Belgian trade is nearly as large as the British, and only slightly smaller quantities come from both Holland and Japan.

Potassium Compounds

The total imports of potassium compounds, with the chlorate and bichromate as the main features, are 22,718 cwts. Most of these are taken from Germany, the only other outstanding suppliers being Great Britain with 11 per cent. of the whole and the United States with 6 per cent. The chief direction of German predominance is with the chlorate, but with the bichromate the business, amounting in all to 5,412 cwts., is fairly evenly distributed between the three supplying countries, with the British product slightly the most important. Magnesium compounds imported into India are also derived to a large extent from Germany, both the chloride and the sulphate, which preponderate in trade with India, coming in the main from our competitor.

Valuable products for which, however, India leans towards British supplies include disinfectants, ammonium salts and bleaching materials. Imports of the first-named are now 34,100 cwts. and this is made up of 19,727 cwts. from this country, 7,500 cwts. from Germany and 4,122 cwts. from Belgium, with minor amounts from other countries. Bleaching material imports are 58,760 cwts. and here the British share of the whole is fully 90 per cent., various continental competitors realising only a negligible business. Receipts of ammonium salts come from Great Britain to the extent of 65 per cent., our supplies being 14,897 cwts. against 6,800 cwts. from Germany and 400 cwts. from the United States. International competition for the Indian market shows itself perhaps most clearly in the supply of acids, which grouped together are valued at rupees 5,39,217 and show a combined weight of 10,240 cwts. This last item is made up of 2,700 cwts. from Germany, 2,267 cwts. from Holland, 1,500 cwts. from Italy, and 2,766 cwts. from Great Britain. Analysed into individual products the position is better defined into Holland as the leading supplier of acetic acid, Italy as the main source of tartaric acid, Germany for oxalic and British supplies as the most important in citric, sulphuric and carbolic acids. The many sided demands of Indian trade are obvious from this brief survey, and the relative force of competition should not be underestimated from a sense of security in our present sound position.

The West African Palm Oil Industry

(By a Correspondent)

ONE of the chief problems that Mr. Ormsby-Gore has had to study in West Africa is that of the land and native ownership thereof, with particular reference to the palm oil industry. It is a matter of the utmost importance to manufacturers and merchants, especially those in chemical and allied industries, who are interested in the economic development of Africa, and, indeed, of the Empire generally.

There are two apparently antagonistic schools of thought, representing (1) European plantations, large factories and native wage-earners, on the one hand; and (2) independent native smallholders, on the other. The two schools are not, in reality, quite so sharply divided as appears on the surface, and the possibility is not excluded of combining the best features of the two policies so as to obtain maximum yields of produce from the land, and optimum oil extraction, without prejudice to native land rights and to a generous encouragement of small holdings.

The need for a thorough examination of land tenure in correlation with palm oil production has been further emphasised by the growing competition of East Indian palm oil, especially from the east coast of Sumatra. It has been asserted, indeed, that this menace from the far east has now become so serious that the West African palm oil industry is threatened with ruin. And there is also competition from the Belgian Congo. Although in a vague and general sense the Congo is often supposed to be a part of West Africa, when palm oil and other tropical products are considered, this is a popular geographical misconception; for whilst the Belgian Congo forms one vast portion of north-central Africa, British West Africa forms another enormous area, and French West Africa yet a third of like magnitude. Few people at home have any clear and adequate conception of the extent of these vast territories. But, whilst in the Belgian Congo, in French West Africa, and in the East Indies the plantation system under European supervision is generally encouraged, in British West Africa this form of enterprise appears to be rather under a cloud; and if British West African produce, palm oil in particular, is to compete with other parts of Africa, Belgian and French, and the Dutch East Indies, in the world markets, it is of vital importance not to jump to too hasty conclusions in regard to land policy and European participation in development.

Native Small Owners v. Concessionaires

It will be perfectly clear in the first place that in such a large extent of territory as West Africa there will be a very wide diversity of tribal customs and traditions, forms of government, and standards of native intelligence; and it would seem to be extremely unwise to limit ourselves to one single form of economic structure, namely that of agriculture only, and in one form only—native small ownership—owing to a confused predilection or sentimental idealism in favour of this one particular structure. Undoubtedly powerful arguments may be adduced in support of small holdings. Probably in Nigeria at all events the matter is of paramount importance, and has aroused the greatest interest, largely owing to the uncompromising attitude adopted by Sir Hugh Clifford and his strong support of native ownership. Another powerful champion of small holdings is Sir Frederick Lugard, who has thoroughly studied the subject in all its bearings, especially in his important work "The Dual Mandate in British Tropical Africa." Many other writers have perhaps gone a little too far and exhibited unduly alarmist tendencies in suggesting that the whole of Africa is seething with discontent, that there is mminent peril of a vast native uprising against the white man, unless the policy of "ruthless exploitation" was sternly repressed, etc. Of these wider political aspects of the great land problem of Africa there is not space to speak here: the economic side is sufficiently important to claim all our concentrated attention just now.

Until recently the exact attitude of the British Government on the question was in some doubt, at least to the native mind; and there was some apprehension that the Colonial Office would wholeheartedly favour the industrial magnates and financiers in their requests for concessions, and would largely ignore the views of Sir Hugh Clifford and of those who think with him. Mr. Ormsby-Gore, however, appears to have done something towards reassuring the native on this point. In a recent communication to the Press he said that there was no need for the introduction of European plantations in Nigeria in order to improve the quality and increase the quantity of the palm oil exported from that dependency. In a subsequent speech he backed up this statement—a very sweeping generalisation—by expressing admiration for the high standard of native agriculture in Nigeria, and intimated that everything necessary for improving the palm oil industry could be done by the natives themselves. This may be taken to mean that efficient oilmills could be established and run, that plantations for experimental research in plant-breeding could be organised, and that the chemical control, grading, and expeditious transport of the palm oil and kernels could be efficiently carried out by the natives; also that the capital required could be guaranteed by the Government on the security of the native crops! Possibly in Nigeria this security would be satisfactory, and possibly there are natives in that part of Africa who could undertake the work described. Certainly they are keen farmers and inspired by an enthusiastic land hunger which, properly encouraged and adequately satisfied, is a factor of great strength in any nation—African or European.

Advantages of European Participation

But although in certain specially favoured parts of Nigeria exclusive native control and native small holdings would be the best and only policy, yet it would surely be foolish and premature to condemn the European plantation system for the whole of West Africa. Even in Nigeria the co-operation of Europeans and the establishment of plantations and oil-mills are not necessarily excluded. To build up the economic structure of a country on one particular form of agricultural industry appears to be very one-sided, inelastic and unstable. No more enthusiastic supporter of small holdings under right conditions, whether in Europe or in Africa, could be found than the present writer: yet he cannot but think that the best solution would be not wholly to exclude European participation, and, whilst fully safeguarding native land rights and adequately providing all the small holdings required, to provide also encouragement and facilities for European enterprise under the right conditions and in localities where such could be suitably carried on to the benefit of both natives and whites, and in the best interests of the country generally.

The old ruthless policy of concessions granted to big capitalised concerns which entirely ignored native rights and feelings is not at all in question, and is a thing of the barbaric past. What is suggested is that there is room for European enterprise. It is not certain that all the natives, even in Nigeria, wish to be independent smallholders. As many as possible should be encouraged to be so and be given every opportunity. But surely there would be many who would like also the opportunity to work for regular wages under the right conditions, for at least some portion of their time. There is no reason why they should not have time both for work in the factory or on the plantation and in their own gardens or holdings. The present position over a large part of West Africa where the native produces palm oil as he pleases and by his own primitive methods is that there is a vast amount of waste. Not half so much oil is produced as ought to be produced from the oil-palms available; and what oil is produced is of exceedingly poor quality, and cannot compete in the world's markets. The native, therefore, must be content with very small returns from his labours.

Natural Gas in Africa

A SHAFT sunk some fifteen years ago by oil prospectors near Johannesburg and abandoned owing to gas discharge, has recently been found to be still discharging. Tests show the gas to give twice the heat of coal and six times the heat of ordinary commercial gas, and a movement is projected to sink more shafts. Mining engineers believe that the gas indicates a rich oil deposit. Leading experts believe that a very large supply of natural gas has been discovered which is perfectly pure, and only needs conveying to the city.

The London Congress of Chemists

A Very Busy Week

In the last issue of THE CHEMICAL AGE *the proceedings of the first days of the Congress of Chemists held last week in London, in connection with the annual meeting of the Society of Chemical Industry, were described. The rest of the proceedings are discussed in the following pages.*

A Week to Remember

MR. WOOLCOCK'S tenure of office as President of the Society of Chemical Industry has been characterised by what the war communiqués would have described as a certain liveliness. But nothing in it exceeded in brilliancy the display of fireworks which he provided for the chemists last week. The events of the week are still too recent to be brought into proper perspective, but to those who attended the Congress those five hectic days will be an abiding memory. The Congress provided a fine gesture of unity, for under its ægis some seven or eight individual societies and associations met in various groups to discuss their special lines of activity. Nothing but good can ome of the contact thus achieved between different specialists.

DR. STEPHEN MIALL.

We referred last week to the issue of a daily Congress Bulletin, "S. C. I. Congress Comments," and we reproduced one of the cartoons (by Mr. Alfred Leete) which appeared in the bulletins. This week we publish another, that of Dr. Stephen Miall.

An Opening for the Academic Chemist

A meeting which was especially noteworthy was that in which "The Influence of Particle Size in the Paint and Rubber Industries" was discussed. Here two industrial associations—the Institute of the Rubber Industry and the Oil and Colour Chemists' Association—met under the chairmanship of an academic physicist, Sir William Bragg. The discussion showed how far we have travelled since the old rule-of-thumb days. To a large extent the problems discussed were not purely chemical; in part they were physico-chemical (colloidal, etc.)—pure physics is clearly playing a greater and greater part—while at least one paper (that by Dr. Green, of America) bore evidence that the mathematician has commenced his deadly work in the paint and rubber industries. Sir William Bragg himself made a notable contribution to the discussion in his plea for the use of the powerful method of X-ray analyses. Foreign workers have already obtained some striking resultsby using this weapon in examining stretched rubber.

Chemical Economics

An innovation at the second session of the annual meeting of the Society of Chemical Industry was the stress laid on economics. The masterly manner in which Sir Max Muspratt handled his review of the economic position and prospects of the sulphuric acid industry was to be expected from one who knows his subject from A to Z. The address of Sir Josiah Stamp, who dealt with monopolies of material, must have come as a pleasant surprise to his hearers. The fact that a professional economist of such eminence should see fit to address his remarks to a chemical audience is not only evidence that the chemist's horizon is widening, but a clear indication that cultured people outside his own ranks are beginning to realise that he plays an important part in society.

Other Items

Considerations of space prevent us from enlarging at length on the other features of the Congress. The discussion on "Power Alcohol," at a joint meeting of the Chemical Engineering Group, the Institution of Petroleum Technologists, and the Institution of Chemical Engineers, indicated that the chemist is in this matter handling a task of great magnitude. But remembering his triumphs in the recent past, it seems likely that his success in the production of alcohol for power may attain the same high degree of achievement as the production of synthetic nitrogen compounds.

The Society's Annual Dinner

A Very Representative Gathering

The annual dinner of the Society of Chemical Industry was held at the Hotel Great Central, London, on Wednesday, July 21. Mr. W. J. Uglow Woolcock, C.B.E. (the retiring president), was in the chair. The gathering included Sir William Alexander, Professor H. E. Armstrong, F.R.S., Dr. E. F. Armstrong, F.R.S. (managing director, British Dyestuffs Corporation), Prof. H. Brereton Baker (president, Chemical Society), Professor W. A. Bone, Sir John Brunner, Bart., Sir John Cadman, Mr. F. H. Carr (president elect, Society of Chemical Industry) and Mrs. Carr, Mr. A. Chaston Chapman (president, Chemical Industry Club) and Mrs. Chapman, Mr. G. C. Clayton, M.P., Sir Arthur Colefax, K.C., Mr. C. F. Cross, the Prime Warden of the Dyers' Company, Mr. E. V. Evans (hon. treasurer, Society of Chemical Industry) and Mrs. Evans, Sir Gregory Foster, Dr. Ernest Fourneau (Société Chimique de France), Mr. C. S. Garland (chairman, London Section, Society of Chemical Industry) and Mrs. Garland, Sir R. A. Gregory, Sir Robert Hadfield, Bart., Sir Frank Heath, Dr. Ellwood Hendrick (American Chemical Society), Mr. Charles A. Hill (chairman, Association of British Chemical Manufacturers), Dr. H. A. D. Jowett and Mrs. Jowett, Professor J. Kendall and Mrs. Kendall, Mr. C. A. Klein (president, Oil and Colour Chemists' Association), Dr. C. H. Lander (director, Fuel Research Board), Dr. H. Levinstein (chairman, British Association of Chemists) and Mrs. Levinstein, Sir Henry McMahon, Professor K. Matsubara (University of Tokyo), Sir Alfred Mond, M.P., Mr. Robert Mond, Dr. G. Monier-Williams, Sir Max Muspratt (president, Federation of British Industries), Sir Frederic Nathan (president, Institution of Chemical Engineers), Sir William J. Pope, Sir Richard Redmayne, Mr. Walter F. Reid, Sir R. Robertson and Lady Robertson, Professor Paul Sabatier (University of Toulouse), Professor A. Smithells and Mrs. Smithells.

The Toasts

Sir ALFRED MOND, Bart., M.P., proposed "The Society of Chemical Industry," for which, he said, he had an hereditary and a filial regard. He recalled that his father, Dr. Ludwig Mond, had been one of the earliest workers in connection with its foundation in 1881, and from that time he himself had taken a great interest in its work, prosperity and progress. The Society of Chemical Industry stood not merely for an academic science, on which fundamentally all our knowledge rested, but also for its application to industrial processes. It was in the welding of scientific research to practical industries that those who were engaged every day in conducting the huge industries for which they were responsible were glad to see a continuous cycle of progress. There was no finality in science. We had manufactured ammonia soda for 50 years, and yet that very afternoon he had been discussing a development which would improve the process. In a tribute to Mr.

Woolcock, he said his period of office had been very successful, and in his capacity as President and in all other capacities he had endeared himself to all with whom he had come into contact. He had conducted the Society's affairs with an amiability which had disguised his masterful hand, and no doubt, as a past president, he would continue to give the Society the benefit of his advice. To Mr. Carr, the incoming president, they all wished a very successful period of office. The Society was absolutely essential to this country's defence, its existence, and its progress. He coupled with the toast the name of Mr. Woolcock.

Mr. WOOLCOCK, responding, said that the basis of the Society was remarkable because it combined both the scientific chemist and the industrialist within it, and that was probably the one secret of its success. To-day the chemical industry ranked among the first six industries of the country from the point of view of the employment it afforded. A quarter of a million people depended upon the chemical industry of Great Britain for their livelihood.

Professor ARTHUR SMITHELLS, C.M.G., F.R.S., proposed "Kindred Societies," coupled with the names of Mr. Charles A. Hill (chairman of the Association of British Chemical Manufacturers) and Dr. Ernest Fourneau (of the Société Chimique de France). The members of the Society were honoured to have with them a representative of their confrères in France, and that that representative should be a man of such conspicuous distinction, the discoverer of stovaine, and one who was contributing so largely to the treasures of chemical knowledge.

Mr. CHARLES A. HILL and Dr. ERNEST FOURNEAU responded, the latter saying that he brought with him the greetings of of the Société Chimique de France to the Society of Chemical Industry and the Congress.

Mr. C. S. GARLAND (chairman of the London Section of the Society) proposed the toast of "The Guests," and coupled with it the names of Sir Max Muspratt (president, Federation of British Industries) and Professor Sabatier (of Toulouse), who responded.

Professor SABATIER (Professor of Chemistry at Toulouse), speaking in French, expressed gratitude for the manner in which the toast had been received, and assured his hearers of the feelings of amity on the part of French chemists for their British confrères.

Dr. W. CULLEN (Member of Council) proposed the health of Mr. Woolcock, who, he said, had aroused such a feeling of affection among the members during his two years of office that they could not allow the occasion to pass without showing their regard for him. They wished him every success in his future activities. The toast was received with enthusiasm.

Mr. WOOLCOCK, in a brief response, said he accepted the compliments paid him as a tribute to the work of the staff, by whom he had been so well served and supported.

Chemistry and Economics

Addresses by Sir Josiah Stamp and Sir Max Muspratt

The annual general meeting of the Society of Chemical Industry, the proceedings on the first day of which were reported in last week's issue of THE CHEMICAL AGE, *was continued on Wednesday, July 21, at the Hotel Great Central, London, Mr. W. J. U. Woolcock being in the chair. Addresses were delivered by Sir Josiah Stamp and Sir Max Muspratt.*

Sir JOSIAH STAMP dealt with the economics of monopolies of raw materials, with particular reference to America. He remarked that he intended to say as little on the chemical side and as much on the economic side as possible, in the fond and certain hope that no economists were present. What he was going to say on the economic side as regards the monopoly of raw materials was wrapped up closely with the chemical industry and profession. He had come to this conclusion after his recent trip to America, where he had discussed with various industrialists and some scientists the points he proposed to put before them.

A Place in the Sun

It could be quite easily understood why countries which were deficient in raw materials generally—in essential raw materials—such as Italy, Belgium, and Japan—should be approaching the League of Nations at a time like this, asking that there should be a committee of a world representative character to consider the position of raw materials and their distribution in the world. The mere accident of the way in which our raw materials were placed, very often far from the countries that were best equipped to use them, should not dictate the economic development of the world, and the countries which he had mentioned were asking for a place in the sun. We could understand Germany, deprived of her colonies, also taking up this great topic. In fact, Dr. Schacht, the Governor of the Reichsbank, declared recently that this was the most important political problem that faced us in the future and that it was much more important than before the war; he had gone on to say that so far as Germany was concerned she meant to have either colonies or some ready means of access to essential raw materials. All this was but natural from the position which these nations occupied, but it was surprising that the greatest vocal outburst should come from the United States, a country with such considerable raw materials, *e.g.*, from 50 to 70 per cent. of the world's total supplies.

In the case of the production of steel, if it were realised that other things were necessary besides coal and iron, it would be seen that nature had been extraordinarily perverse in the distribution of the essential components. In the countries which were richest in coal and iron there was an almost complete absence of the essential materials such as manganese, chromium, nickel, tungsten, vanadium, and so on, and the countries where these ingredients were to be found were deficient in coal and iron. It was absolutely necessary for the countries rich in coal and iron to get hold, in some way, of these other commodities which were so sparsely distributed over the world and so closely held by other countries over whom, at first sight, the countries having iron and coal had no control. He asked them to imagine this problem as one between Rhodesia or New Caledonia or Cuba or some other country, and the United States. The whole world stood to gain by these two products being brought together, as otherwise the countries that were best fitted to manufacture steel on a large scale, and therefore cheaply, could not do it.

Home Production and an Alternative

There was an example, it was true, during the war of the fact that where there was a difficulty in getting materials, a very high price could and did have the effect of bringing into practical being deposits of low grade materials that were not, in the ordinary way, workable. In the United States, for instance, in the case of manganese, the total supply rose from 1 per cent. to 24 per cent., but a very considerable part of it was produced at a loss. But it was a little rhetorical for the American politician to thump his chest and say "We will produce manganese ourselves if it does not come from elsewhere." That was all very well, but it was surprising what a change came over the position under the influence of commercial losses and the fact that the supplies were reaching an end. With regard to chromite, America's output at present was 252 tons, whilst the total consumption was 153,000 tons. No amount of thumping of the chest and saying "We will do it, boys," would overcome a position like that (laughter). The remedy, therefore, for improving the value of low grade supplies and of finding alternative supplies was research in those cases where there was any kind of political hindrance in the case of such materials as tungsten, nickel, manganese, chromium, vanadium, etc., which were in places so far away as Peru, Russia, and the Caucasus.

At the same time, there was another alternative, *e.g.*, American capital could control these supplies in other countries. America could permeate with her financial resources. She could not control these other countries, but her position as an exporting country was such that investment was bound to find a way into countries containing raw materials essential for her, and the political problem brought about by that kind of penetration—some sort of semi-political dictatorship of half-developed countries—would be a very serious problem

for them all. It was, however, a very practical argument for peace that we should have large manufacturing industries in our industrial countries which were dependent on the resources of far away parts of the world for actual existence, which could only be obtained by a continued command of the seas.

There were only a few essential raw materials which were outside either American or British Empire influence and control, and the Franco-German potash and Chilian nitrates would be the two most conspicuous examples. But what about the United States' cry about foreign export controls? The reason was that taking the whole of these controls, the United States was a producer over the whole lot collectively of about 50 per cent., so that she would feel the pinch if there were any kind of control being exercised against her for forcing down the volume of supplies or forcing prices up. There were three distinct classes of raw materials, and each had its own separate economic considerations to be borne in mind. First of all, there were those raw materials which were a pure monopoly to the country producing them, and where there was no home use for them in the way of home manufactures and so on. In such a case, the chief interest of the country in question was that of an exporting country which wanted to get the maximum of exports and also to raise revenue. The control was either for revenue purposes or for conservation of the material. The second class was where there was a monopoly of the raw material, but the country also wanted to use it itself or wanted to develop a home consumption, and that introduced a very important political element. The third class was where there was no actual monopoly but where the whole problem of control was stabilisation of price, such as the problem of rubber.

In the first class there were very few cases where there was any success in establishing a monopoly grip without some Government assistance. In the second class, where there was a desire on the part of the controlling Government to stimulate a home manufacture, they could not consider merely an addition to the price to be paid by the foreign consumer, but it was necessary also to consider the home manufacturer. There were many cases, such as logs and pulp in Canada, and certain cases in Europe such as scrap iron, but if it were extended beyond the country in the country's political interests, then the whole scope of this particular class of case was widened, and we got to the whole question of Colonial preference. As to the third class of case, that relating to stabilisation, Sir Josiah said that what the world was hungering for to-day was the prospect of some settled period in which industry would know what its costs were going to be and by which it would be possible to work something like a reasonable programme without the integral features tumbling over each other like a kaleidoscope. If we could get stability even at 10 per cent. higher prices over a period, it would be worth while doing it.

Sir Max Muspratt on Sulphuric Acid

Sir MAX MUSPRATT said he proposed to deal with some problems of the sulphuric acid industry. Sulphuric acid had been described, and rightly described, as the life blood of any industrial nation either in times of peace or war, and it was very essential that that life blood should be tested from time to time. At any rate the blood pressure test should be submitted, and it was probably quite well known to everybody present that under that test the report "very torpid" was the only possible report there could be at present.

What were the facts with regard to sulphuric acid at the present time? In 1915, before the real war expansion of sulphuric acid production, the production of this country was 1,083,000 tons expressed as 100 per cent., and the capacity was 1,200,000 tons, also expressed as 100 per cent. The figures for the years before the war were practically the same. Last year the production was 848,000 tons, a drop of 200,000 tons, and the capacity was 1,400,000. The pre-war capacity in chamber acid was 1,040,000 tons, and in oleum 22,000 tons, whilst the post-war capacity was 1,265,000 tons chamber and 450,000 tons oleum. He admitted that the figures did not quite agree, but the fact he wished to bring out was the great alteration in the position as between chamber and oleum.

An analysis of the various industries in which sulphuric acid was consumed showed that in 1913 the consumption of sulphuric acid for superphosphate manufacture was 300,000 tons, whilst in 1925 it had fallen to 161,500 tons, a drop of nearly 50 per cent. In sulphate of ammonia manufacture the consumption of sulphuric acid was 280,000 tons in 1913, which had fallen to 215,500 tons in 1925. For the manufacture of bleaching powder, hydrochloric acid, and alum there was a big change in the figures owing to a change in the process. The sulphuric acid consumption for these purposes in 1913 was 186,000 tons, and it had fallen to 90,500 tons in 1925, again a drop of 50 per cent. Similarly for most other of the important uses of sulphuric acid such as iron pickling, textiles, dyeing and bleaching, copper sulphate, dyes, oil refining, and explosives, there had been a fall, except in a few instances, in the quantity of sulphuric acid consumed as between 1913 and 1925, and the only satisfactory heading in the uses of sulphuric acid was "numerous other smaller uses," for which the figure in 1913 was 106,000 tons, which had increased to 186,500 tons in 1925.

A Post-war Change in Raw Materials

He would give one other set of figures relating to the great changes in raw material in the sulphuric acid industry between the pre-war period and now. Of the acid made in 1914, 88½ per cent. was made from imported pyrites and the trifle of ½ per cent. was made from domestic pyrites; 10·6 per cent. was made from spent oxide; only 0·3 per cent. was made from brimstone and 0·15 per cent. from zinc and copper fumes. A great alteration had taken place in that position in 1925, because instead of 88 to 90 per cent. being made from imported pyrites, only 47 per cent. was so made in 1925; 24 per cent. was made from spent oxide; 24 per cent. was made from brimstone, and 5½ per cent. was made from zinc and copper fumes. The increase in the amount of sulphuric acid made from spent oxide, from the British point of view and from the point of view of the industry, was all to the good because this was the only raw material which we possessed in England, and it was satisfactory to see the manufacture of sulphuric acid from that source increasing. Moreover, it reflected very great credit upon the whole of the gas industry and also some credit upon the sulphuric acid industry that they had made such a large contribution between them, amounting to 24 per cent. of the total.

These were the broad facts of the position now, and he proposed to turn to the economics of the matter, not economics in the sense understood by Sir Josiah Stamp, but in the sense understood by industrialists and business men. He knew that quite a large number of consumers, if they were absolutely frank, would say that a very large amount of the fall in the consumption of sulphuric acid could be made up again if the price of sulphuric acid was dropped. That was a very plausible suggestion, and was one, he need hardly say, which the sulphuric acid manufacturers watched continually. If they believed that a real drop in the price of sulphuric acid for a short time would enable the consumption to go up by leaps and bounds, undoubtedly they would drop the price. They did not, however, wish to see sulphuric acid go the way of the depreciating market in years gone by or the depreciating franc at the present time. The sulphuric acid manufacturers believed it was in the best interests not only of the industry, but of the whole of the industries in this country, that sulphuric acid should be maintained on as near a stabilised economic basis as was possible, and what the manufacturers tried to do was to base the price of sulphuric acid on the prime cost plus overheads, which included depreciation and some profit to the efficient works.

Many other methods could be adopted, such as dropping prices and seeing what happened as a result, but the manufacturers, for various reasons, did not believe that was a sound method. He would mention one reason—namely, the question of depreciation. One often saw in the trade journals suggestions made that sulphuric acid cost a certain figure, and quotations were made from Government papers and various other sources to show that sulphuric acid ought to cost so many shillings per ton; but on to that must be added a figure for depreciation, and that figure had to be a rather large one, because the sulphuric acid industry was constantly altering. The wear and tear was very great, and the only way, over a long period of years, of permitting the lowest possible price for the acid was that plants should be kept up to date.

Somerset House was not an easy body to convince, but after investigation of many figures over 20 or 30 years, the authorities had granted the sulphuric acid industry the largest depreciation allowance of any industry in the country, and the sulphuric acid manufacturers felt that having proved that before such a very scrupulous body as Somerset House, they were entitled to say it was unsound to sell sulphuric acid unless it would pay at least this depreciation and something to form reserves. That was the particular point which the manufacturers had gone upon, and he believed it to be sounder than the course pursued on the Continent, for instance, where prices of sulphuric acid had got out of hand altogether and the material was selling at a figure which spelt ruin for anyone who depended upon it alone. That was one of the factors which was worrying Germany very much indeed. She had stabilised her mark in a very brave and able manner, and just as the mark had been stabilised and when she ought to be getting some results after two years of suffering, she found she had lost control of several of her big products, including sulphuric acid.

Pure Acid and Pyrites Acid

Just as Great Britain was prepared to face all the difficulties of high taxation, stabilisation of coinage and a return to the gold currency, so he believed it was a wise policy in sulphuric acid and other big products to see that the price did not fall below the economic value on the tests he had just submitted. The position was very much complicated by the question of by-product acid; and, moreover, the exceptionally low rate of the Italian exchange had produced a very artificial state of affairs in England. It was very good for the consumers because they got the purest acid at a comparatively low price. It might also be good for the manufacturers of other products, but it could not last for ever; it was one of those economic uncertainties which was extremely worrying to the sulphuric acid industrialist at the present time. There existed the absurdity that in many cases pure sulphuric acid could be produced very much more cheaply in this country than pyrites acid, but there was not enough to go round. What would happen if the price were dropped to the price of sulphur acid? What was going to happen to those who wanted pure acid? He was not prepared to say. He hoped that every consumer of sulphuric acid would make a mental note of this because he felt there was an unreasonable demand for very pure acid at the present time, and economically it could not last. It was an exceptional position, and he suggested that everyone who could use ordinary acid and by any very simple process purify the article themselves should at any rate prepare for that, because he was quite sure that economic conditions were bound to come to a point when pure acid would have to be charged at a very much higher figure than pyrites acid, whatever might be the relative figures of the two.

Another thing that had affected sulphuric acid very much was the new processes which did not use sulphuric acid at all. The manufacture of synthetic ammonia would have been a godsend to the sulphuric acid industry if only it had used sulphuric acid. Unfortunately it was found that gypsum could be used, although he was not at all sure that the last word had been said on the economics of the matter, but the fact remained that for synthetic ammonia there was the great instinct to go to the gypsum beds instead of putting the plant alongside sulphuric acid works. Then there were a large number of high pressure processes which at the moment affected the sulphuric acid industry and would do so far more in the future, because if it were possible to make an organic acid synthetically by one of these high pressure processes, then they would not want sulphuric acid for turning it out of its compound, which was the ordinary method by which organic acids were made. Thus the sulphuric acid industry was going through a period of extreme perplexity. The manufacturers were watching the position as closely as possible to see any signs of a real equilibrium in consumption.

A vote of thanks to Sir Josiah Stamp and Sir Max Muspratt, proposed by Dr. H. Levinstein (foreign secretary), was carried with enthusiasm.

Fat Extraction by Solvents

Description and Discussion of a New Type of Plant

A meeting arranged, in connection with the Congress, by the Institution of Chemical Engineers and the Oil and Colour Chemists' Association was held on Friday, July 23, at the Hotel Great Central, for the discussion of "Fat Extraction by Solvents," Sir Frederic L. Nathan presiding.

Mr. L. J. Simon and Professor J. W. Hinchley read a paper on "A New Plant for Fat Extraction by Solvents." It was stated by Professor Hinchley that the plant described in the paper was due to the initiative and mechanical genius of Mr. Simon. He himself was merely a member of a debating society consisting of two members, of which a meeting was called occasionally to discuss matters connected with fat extraction.

The New Plant

The authors stated that in the design of the extraction plant described, there was never more than 4 cwt. of material in the plant at one time, although the output in eight hours was approximately three to four tons. The total time of extraction was approximately 30 minutes; the total time of "steaming off" of the meal, in order to free it from solvent, was from 4 to 6 minutes. This short period was accomplished by the peculiar method of treatment, by pre-heating the meal to nearly the temperature of the steam, and by the fact that the steam had only to pass through a few inches of material instead of a depth of three or four feet as in an ordinary type of plant. All the meal was in contact with the solvent for the same length of time. The distillation of the oil solution was taking place continuously, and only solvent well saturated with oil entered the stills. The time of heating both the meal and the oil was reduced to the minimum. A plant treating 3 tons of meal at a charge would usually require 7 tons of solvent for its treatment. In the machine described, the amount of solvent required for the same output was not more than 1 ton.

The achievement of such results in this machine was due to the fact that small quantities of material were dealt with at a time and that the rate of solution of the fat was high and the removal of the solvent from the meal was thorough. Large entry pipes were used for the solvent, continuous agitation with the solvent took place, the depth of meal was only a few inches, and by the operation being conducted in a rotating cage, the amount of liquor left in the meal on drainage was a minimum. The cage or basket consisted of a perforated drum, carried on a hollow shaft through which the solvent and steam were allowed to enter. It was rotated at different speeds according to the operation. The meal was charged into the cage by the removal and replacement of one of the end plates, and the cage was inserted into a cylinder carrying the gear for rotating it.

After placing the cage in the cylinder, two coupled valves were opened by which steam entered the cylinder and most of the air was driven out; one valve communicating with the supply of steam and the second valve being open to the atmosphere. Each machine, as at present designed, carried three of these cylinders with their cages and each one was operated separately and, after the operation of charging and discharging, automatically hydraulically controlled valves, which were operated by means of a timed "cam" shaft, determined the opening and closing of the different valves during the operations. This "cam" shaft controlled the whole of the operations from the entry of the solvent until the extraction and steaming off were completed. It made one complete revolution in 32 mins. and had 16 movements, making each movement of 2 mins. duration. The operation of each movement was so rapid that practically, during the whole of the 2 mins., the operating valves were open or closed as desired.

The operation of the machine might be divided into seven stages: 1. A preliminary treatment of the dried meal with solvent vapour; 2. A washing of the material with a strong solution of oil and solvent to obtain an extremely rich solution for distillation; 3. A second treatment with solution, which was used for the next charge for operation (2); 4. A third treatment which was used in the next charge for operation (3); 5. A final treatment with pure solvent; 6. A drying period, in which most of the liquid solvent was expelled from the meal by centripetal force, the material being warmed by indirect

steam; 7. Steaming off with direct steam to remove the last traces of solvent from the meal.

A number of experimental extractions had been carried out with a single-cylinder plant of this type. A complete machine was being constructed in Germany and another in England. Unfortunately, owing to the coal dispute, the latter was not ready for work. The experimental work had indicated that there would be no difficulty in achieving successful operation with any oil seed. It would be obvious that the consumption of steam and solvent would be lower than in ordinary plants, and the labour cost would be less through continuous employment. A very important point was the fact that the extracted meal was discharged from the plant in a dry condition. A still more important point was the high purity of the oil. The linseed oil obtained was free from the normal smell of linseed oil and puzzled even experts. On heating it became very pale, and when boiled had no offensive odour. On account of the fact that only a small supply of solvent was required, the range of solvents was increased and differential extraction became a commercial possibility.

Discussion

Dr. GEOFFREY MARTIN considered that the new plant represented a very considerable advance on present technique. Anyone who had been used to industrial engineering and had followed the history of the subject knew that advances always occurred in one direction, i.e., from the intermittent processes to the continuous. That also applied in this case, and the continuous process, working night and day, gave an output which was incredible to those who were accustomed to non-continuous processes. Thus, from the scientific point of view, this development was a step in evolution in the correct direction. But there was another important advance, and that was in connection with the time element. All organic bodies, and especially foodstuffs, when heated for a long time lost immensely in value. In the case of milk, oil, and so on, the vitamine content was seriously diminished, and in the case of cod liver oil, for instance, that was a serious consideration, because its value depended largely on its vitamine content. In a largely refined oil practically all the vitamines had been killed, and from that point of view the process described in the paper represented a very big advance. He had carried out experiments in which the time of heating of milk in the making of condensed milk was reduced to one-tenth of a second, or something of that order. The resulting milk was perfectly sweet and exactly like ordinary milk in taste, because there was not sufficient time for organic decomposition to occur. In the process described in the paper a similar influence was at work.

Mr. R. A. BELLWOOD considered that statements made in the paper were distinctly misleading to those without intimate knowledge of fat extraction. The only conclusion he could come to was that if the authors had not intended to mislead their hearers, their knowledge of the present state of extraction was very vague indeed. They had stated that in the large-scale solvent extraction plant the average time taken to extract oil-seed had occupied from 6 to 12 hours, or even longer, with an interval after each extraction, when the vessel was discharged and re-charged with crushed meal. He knew of a plant which was working in Hull at the present moment and which had 24 extraction vessels. Each of these vessels held 2 tons of material, and he had been informed that the plant had treated over 2,000 tons of material in a week of 144 hours. This was an average of 3·43 hours, which included the time for both filling and discharging. The authors had further stated that the time occupied in steaming was from two to four hours. Seeing, however, that the whole process in the Hull plant occupied less than four hours, surely the authors had made a grave error. As to the rotation of the cage or basket being sufficient to keep the meal in a constant stage of agitation and changing position, he himself had arranged a somewhat similar process during the war. There was a very great similarity between that process and the one described by the authors.

Mr. E. R. BOLTON, discussing rapid extraction, said the problem had been put very plainly by Professor Hinchley when he had indicated that if one had two or three tons of meal and covered it with solvent, all the oil which was to be extracted might, for all practical purposes, be considered to be in a solution. That was the basic principle of the whole phenomenon. If we could invent a device whereby the solution of oil was instantly separated from the meal we should have instantaneous extraction. Such a device was impossible, but the authors, in a most ingenious manner, and with the most fascinating mechanical contrivance, had proceeded to separate the solvent in a very rapid manner. In altering the old process and overcoming some of its inherent difficulties they had introduced new difficulties. He had studied extraction for many years. He was glad to have come to the opinion, as the result of his study of the question, that this country was as far advanced as any in the world on the subject of extraction, and hoped that the mechanical devices now put forward would enable us to advance still further.

Mr. SIMON, dealing with Mr. Bellwood's criticism as regards steaming, said the authors had in mind that, because of the difficulty of steaming off the last traces of solvent from the meal, due to the clogging of the meal resulting from excessive moisture, it was almost impossible to extract some seeds economically. As to the size of the charge, mentioned by Mr. Pooley, he said it would be generally admitted that in an attempt to design an extraction plant to deal with small quantities economically, it was much better for the designers to go to the extreme. With this plant they were tied to no particular size.

Professor HINCHLEY, who also replied, said there were a number of chemical problems which were being dealt with. As to the purity of the oil produced, there were samples of linseed oil obtained from the plant available at the meeting, and some samples of meal, which he invited those present to take away and inspect for themselves; they would bear inspection quite well. Mr. Bellwood had brought the prejudice of a long experience, and a very valuable experience, to the front with a vengeance, but it should be borne in mind that the figures which he (Prof. Hinchley) had given had reference to a 3-ton and not a 2-ton plant. If it came to a competition on time he could assure Mr. Bellwood that the new method would beat him hollow and that he would not have a look-in.

The notion appeared to be held that the drum in the new automatic plant revolved at centrifugal speed, but it did not. The amount of centrifugal action that occurred was not very great, and if the peripheral speed of the drum were increased to centrifugal speeds of 7,000 or 10,000 ft. per minute, there would be a lot of trouble with the materials to be extracted. The highest speed was of the order of 300 or 330 ft. per minute, which was extraordinarily slow, but it gave all the centrifugal action that was needed without packing the material, and without bringing about failure through the formation of impenetrable walls.

Discussion on the Hormones

The Natural Drugs of the Body

On Tuesday, July 20, a joint meeting of the Biochemical Society and the London Section of the Society of Chemical Industry held a discussion on "The Scientific and Industrial Problems presented by the Hormones—the Natural Drugs of the Body." Sir Alfred Mond, presiding, said that as a chemist he looked forward to the time when we could control genius, morals and sex by chemistry, and by obtaining the correct chemical reaction.

The great discovery of the equivalency of heat and work caused a tendency to regard the human body as a kind of engine. Then the discovery of vitamines showed that there was another most important factor, and that mere calories were by no means the only requirements. It would not be an unfair analogy to appreciate the function of these bodies by imagining that some genius had designed a steam engine on purely thermo-dynamic grounds and had not seen the necessity of lubricating it. Hormones, or the chemical messengers of the body, as Professor Starling called them, appeared to play a similar part in the general physiological relation to the body to that played by vitamines in the assimilation of food. British pharmacologists had played a very important part in the scientific work by which the properties and the chemistry of the natural active principles secreted by the glands of the body had become known. Dr. H. H. Dale had contributed to our knowledge of three of the most important hormones—adrenalin, pituitrin and insulin, while quite recently, by a brilliant piece of work, light was shed on the constitution of thyroxin by Dr. Harington, of University College. Although

he had known many scientists who had created industrial inventions and scientists who had created industries, he had never yet known a commercial or financial genius who had invented a scientific process. The fundamental advancement must always be made by the thinker and the inventor.

Dr. H. H. Dale, in a paper on "The Experimental Study and Use of Hormones," said that when Dr. Dudley and himself brought back from Canada the details then available concerning the difficult process of the manufacture of insulin, they thought, with the rest of the world, that insulin would be so restricted in quantity, and the necessary cost of its production so high, that it could only be used to save the lives of the wealthy few. The scientific industry of this country had good reason to be proud of the fact that, within eighteen months, it was possible so to increase production that, after satisfying all requirements here, a large balance was available for export, and to reduce the price to less than one-eleventh of that originally required; so that the sufferer from diabetes, however narrow his means, could now obtain the hormone needed to keep him healthy and efficient at a weekly outlay comparable to what many a man spent on tobacco.

Dr. H. W. Dudley, in a paper on "The Chemistry of the Pituitary Gland of the Body," said that 100 grains of the active principle from the pituitary gland would involve the working up of material from a million oxen, so it was extremely difficult to get adequate quantities for research purposes.

Other papers read were: "The Commercial Production of Hormones," by Mr. F. H. Carr; "The History of Adrenalin," by Dr. H. A. D. Jowett; "Recent Progress in the Chemistry of Thyroxin," by Professor G. Barger, F.R.S.; and "The Biological Assay of Hormones," by Dr. J. W. Trevan.

Discussion on Solid Smokeless Fuel

First Official Meeting of the Fuel Section of the Society

A meeting of the recently organised Fuel Section of the Society of Chemical Industry was held at the Hotel Great Central, London, on Friday, July 23, in connection with the Congress of Chemists. Mr. W. J. U. Woolcock, who took the chair at the opening, said his duty was to say a word or two with regard to the first official meeting of the Fuel Section. This was not a new development of the Society for doing this particular work; the only thing that was new about it was that instead of the work being done by a very informal committee, such as was the case in regard to the arrangements in connection with the discussions at Leeds and Sheffield, the Society had determined to set up a Fuel Section, and this was the first official meeting of that Fuel Section. On the present occasion the meeting was a joint meeting with the Coke Oven Manufacturers' Association and the Institution of Gas Engineers, and he wished to express the thanks of the Society to these two bodies for co-operating in this meeting, and for assisting in what he believed would happen, namely, further co-operation as time went on. Professor Arthur Smithells (Chairman of the Section) then took the chair.

Summary of Papers and Discussions During 1925

Dr. E. W. Smith then read a "Summary of Papers and Discussions on 'Solid Smokeless Fuel' during 1925," compiled by him. He mentioned the activities of the committee of the Chemical Engineering Group, which arranged in 1925 two symposia on solid smokeless fuel, one at Leeds in July, and the other at Sheffield in November. The success which attended these conferences led to the general expression of the opinion that co-operation of those interested in the technical and economic aspects of fuel utilisation should be continued and become permanent. As the outcome of this feeling, the Fuel Section of the Society of Chemical Industry had been started to continue the work of this joint committee. The first big conference of the Fuel Section would be on "Tar," and was due to take place in November. It would give an opportunity for a full discussion on the paper entitled "A Study of Tars and Oils Obtained from Coal," presented by Messrs. Sinnatt and King at the Leeds conference.

The summary went on to state that in 1924 the total home consumption of coal amounted to some 180 million tons. Of this quantity not more than 20 per cent. was subjected to such pre-treatment as would render the solid product smokeless. Approximately, 90 million tons of raw coal per annum were used for steam raising and other industrial purposes, and 40 million tons were used for domestic purposes. On the whole, the industrial uses of coal were more efficient and less harmful as regards atmospheric pollution than the domestic uses. It was therefore towards the substitution of solid smokeless fuel for these 40 million tons of domestic coal that these discussions were directed. Smokeless fuels came under two heads—natural fuels and carbonised fuels. Of the natural smokeless fuels, anthracite was the most important. Approximately 5 million tons of anthracite were mined per annum in this country. The advantages in the use of anthracite which counterbalanced its increased cost were its purity, smokeless character, high apparent specific gravity, uniformity of size, and hardness. Apart from anthracite for the production of smokeless fuel, some process of carbonisation was necessary. There were three possible methods of coal carbonisation, *e.g.*, the gasworks process and the cokeworks process (both of which were, of course, in extensive use), and the low-temperature process of carbonisation.

The present position, as regards solid smokeless fuel, might be summarised as follows:—There was an immediate demand for a supply of solid smokeless fuel for domestic purposes. For this supply to meet with success, the solid smokeless fuel must be sold on a competitive basis with house coal, must be combustible and easily ignitible, and must not cause the user extra trouble with ash or smell. The supply of smokeless fuel might be obtained by various processes, according to local conditions, but it appeared likely that the already established gas and coking industries would be the suppliers of the bulk of solid smokeless fuel, whether by high or low temperature processes. At the present time low temperature processes were both technically and economically unproven. A supply of satisfactory solid smokeless fuel could be obtained from the gas and coking industries in already existing plants if adequate attention were paid to the facts that the coke must be dry, suitably graded, and have a reasonably low ash content. Dry coke could be obtained either in intermittent processes of carbonisation by carefully limiting the amount of water used, or in the same processes by quenching the coke with inert gases, recovering the heat therefrom as steam; and in continuous processes, by quenching the coke in the retort with steam. The grading of coke merited close attention. Standardisation of coke grades was recommended.

In order to have coke with low ash content, some process of coal cleaning, either by dry methods or by washing, followed by drying the coal, was frequently involved. The product of high temperature carbonisation processes could be further improved by altering the physical form of the coke. The fundamental basis of this improvement was to obtain a coke with a structure consisting of a large number of small cells with thin non-graphitic walls. This could best be accomplished by suitable blending. Blending of coal had the advantages of making the solid product resulting from carbonisation more combustible and more easily ignitible, of giving a more compact fuel, and of making available as potential solid smokeless fuel material otherwise unsuitable; while if ultimately found desirable, a satisfactory solid product containing 3 to 8 per cent. volatile matter could be obtained in high temperature carbonising plants by suitable blending.

Discussion

Prof. H. E. Armstrong, F.R.S., said they had been treated to half-an-hour of hashed Sheffield and Leeds, and the dish that had been offered on those two occasions, specially at Sheffield, was not bread but stone in the form of hard gasworks coke, and that was the dish that had been presented to them again on the present occasion. This meeting and the two previous meetings at Leeds and Sheffield had been held entirely in the interests of the gas companies, but what this country needed was a complete and full discussion of the very great problem of the future of coal, not of coke, and that

ought to have been the subject to-day. That was all he had to say.

Dr. Lander on Low Temperature Carbonisation

Dr. LANDER said that he understood that the subject of low temperature carbonisation was not left out of this particular discussion and there were one or two points he would like to make in this connection. In the paper there were abstracts from his own paper in which certain conclusions were given with regard to low temperature carbonisation, perhaps some naturally cautious conclusions, but again things had happened since then. In the first place one of the statements made there was with regard to the present economic position of low temperature carbonisation. It was necessary to be very careful about this and at the same time it was necessary to hold the balance between the wild extremists who said the whole thing was done and had been done years ago, and those who said that it never had been and never could be done. He personally was a distinct optimist in this matter and always had been. As he saw the position it was this : that in the natural development which must always occur in a chemical process and in many engineering processes from the pure laboratory stage to the final commercial operation, four stages must be gone through. Sometimes a stage was jumped, but if a stage was jumped it was a pure gamble ; it might come off—an outsider often won the Derby—or it might not. The stages were, roughly, first, the laboratory stage of doing the job with a few grammes or a few pounds. In low temperature carbonisation that stage, of course, had been passed years ago. The next stage was the intermediate stage of doing it with a few pounds. Usually the object of the promoters at that stage was to get data from which they could design a unit scale plant. Having done that and overcome the usual difficulties with a unit scale plant, they finally arrived at a stage at which they had a plant capable of dealing perhaps with 10 tons per day and in some cases 50 tons per day ; it all depended on the type of process. That stage, however, could not possibly prove the commercial possibilities of a process. It gave certain data to go on, but in the case of a radically new process in which one did not know what the financial value of the oils was going to be (if the market were flooded, for example), it was necessary to go through what might almost be called the commercial experiment stage with an actual plant having a capacity of 200, 500, or 1,000 tons per day, and to run that for two, three, and sometimes more years.

In this connection the work being done at the Fuel Research Station was very promising. Plant of a certain type had a through-put of eight tons per day and the experimental work had been going on continuously for 24 hours a day for nearly four years. He held no brief, however, for that plant. It was merely an exploration, a research on a rather large scale on a type of plant which was deliberately selected because nobody was exploring in that direction. The work at Greenwich had been carefully done so as not to queer anybody's pitch. One of the great difficulties of low temperature carbonisation was past history, the statement that had been made of the promised land which had never been reached, and naturally people were getting rather shy of some of these schemes. That, however, was not the fault of the many very earnest and genuine workers who were on the job at the present time. Indeed, they were to be commiserated in regard to it. On that account some 18 months ago the Government directly empowered the division of the Department which was in his charge to offer to test, free of charge, any plant which afforded a certain amount of promise.

Dr. R. LESSING said it was not often he found himself in agreement with Prof. Armstrong, but on this occasion he found himself in entire agreement with the note he had sounded in opening the discussion, viz., that after all they should be discussing the fundamentals of coal and, he would like to add its behaviour at the high temperatures to which it was submitted either for carbonisation purposes or for producing other products or when being burned in the raw state. It was, essential that this should be realised before the Fuel Section was launched upon its career, so that the differences which existed and had brought into existence two factions in favour of one or the other system should not be encouraged and, indeed, should be done away with. Dr. Lander had given an interesting example of the work being done at Greenwich, where a solid fuel such as it was desired to produce by the low temperature process had actually been produced by the high temperature process, at any rate in a high temperature plant, so that the question was rather more one of the study of materials than of plant.

Particle Size in Paint and Rubber

Its Industrial Influence and Importance

A joint meeting of the Institution of the Rubber Industry and the Oil and Colour Chemists' Association was held at the Hotel Great Central on Thursday, July 22, the subject of discussion being "The Influence of Particle Size in the Paint and Rubber Industries." Sir William Bragg, F.R.S., presided.

Mr. C. A. KLEIN, in a paper on "The Importance of Particle Properties in Paint Pigments," made a general review of the subject. He pointed out that before any real progress could be made, they must be able to define the state of division of pigments in precise terms. Certain methods had been applied to that end, but none were either simple or rapid. It appeared to him probable that less refined methods would prove of great value in elucidating, on broad lines, some of the relationships between particle size and paint properties. He was convinced that, in view of the fine state of division which generally held in regard to all pigments, recourse must ultimately be had to quantitative microscopical examination. Screening methods had but limited value. Elsewhere he had discussed the importance of graphically illustrating the particle size distribution of pigments where, as was often the case, pigments consisted of mixtures of particles of varying sizes, and he doubted the value of the average size or specific surface factors in this connection. Among many other problems in the paint industry which were definitely related to particle size and surface were such phenomena as spreading and hiding power, colour, suspensibility in liquid media, extent and ease of dispersion in liquid media, wetting power, oil absorption, flocculation, consistency and texture—each of which were in themselves separate problems for investigation.

From the practical and economical standpoint he insisted that, although it would generally be agreed that it was possible to fix the maximum size for pigment particles, they were without sufficient information to justify the present craze for ultra-fineness of division in any and all paint materials. It was frequently found that pigments were not improved by over-grinding ; indeed, the differences in properties between coarse and fine grades were so great as to make the ultra-finely divided product an entirely new material, the properties of which were unknown. On the practical side it must be realised that, despite the remarkable advances which had been made in grinding machinery and plant for air flotation, separation and sizing, there was a limit beyond which the cost of production might far outweigh the advantages which might accrue from the use of very finely divided solids in the place of those now in use.

Particle Character in Rubber Pigments

A paper on the "Importance of Particle Character in a Rubber 'Pigment,'" by Dr. D. F. TWISS, was read by Mr. B. D. Porritt in the absence of the author. The latter dealt with the use of chemically active powders (litharge, magnesium oxide, and zinc oxide), and "inert" powders (barium sulphate, China Clay, lamp black, etc.) ; the influence of particle size on reinforcing action ; the "particle theory" of vulcanisation ; irregularity in particle size ; and other effects, such as particle shape, the adsorptive power of particles, and hysteresis. He stated in conclusion that the significance of the physical characteristics of the particle, from the point of view of the importance of the desirable effects which could be obtained by "compounding," could not be exaggerated. The "super-rubber" of the future would demand mechanical strength and ability to withstand abrasion and rapid working. It would probably be no new type of rubber at all, but would consist of the present type of plantation rubber, improved almost beyond recognition by some compounding ingredient—possibly one already known but introduced in some novel

manner so as to provide particles with new physical characteristics.

"The Value of a Direct Measurement Method for Particle Size Determination" was dealt with by Dr. H. GREEN (U.S.A.). He concluded that the value of a direct or photomicrographic method for the measurement of particle size was due to the fact that it gave a particle distribution curve; and that such a method did not always impose the necessity for assuming cubical or spherical particles. From the particle distribution curve all the necessary information was derived that enabled the investigator to calculate the particular average diameter that was required for his work. The fact that specific surfaces could not be determined from ultra-microscopic measurements was particularly emphasised.

The ultra-violet microscope promised to be a useful instrument in the hands of the pigment microscopist, but this instrument brought with it new problems to be solved, none of which were apparently unsurmountable. When these difficulties were finally overcome it should be possible to measure, by microscopic means and with a reasonable degree of accuracy, particles that lay close to the borderland of the colloidal region. This would be a desirable and valuable extension to the direct measurement method for particle size.

Dr. S. S. PICKLES discussed "The Influence of Particle Size in Rubber Manufacture." The bearing of particle size on chemical activity, he said, lay chiefly in the fact that in most rubber mixings, during the process of vulcanisation, the mass had the consistency of a solid, or, at the best, of a very viscous medium, in which the mobility of the reacting elements or groups was of a very restricted order. There could thus be nothing like the condition which they had in a chemical reaction taking place between two liquids or materials in liquid solution, where there were ions possessing high mobility, and where it was almost impossible for local concentration to persist for any prolonged period. In reactions in solid or viscous media the amount of reactive particle surface and the proximity of the reactants were the main considerations rather than actual concentration. It was therefore obvious that the smaller the particles and the more uniform their dispersion, the closer would be the approximation to the conditions necessary for rapid and complete reaction. With regard to the influence of particle size on pigmentary properties, so far as rubber manufacture was concerned, it did not seem at the present moment that any satisfactory generalisation could be made.

A New Separating Apparatus

"An Apparatus for the Separation of Grit and Coarse Particles from Fine Powders" was described by Mr. G. GALLIE and Mr. B. D. PORRITT. The principle of the method adopted consisted in suspending the powder under test in water, and supplying the mechanical force necessary to secure the passage of the fine particles through the sieve and the breaking down of any lumps by a jet of water under pressure. The apparatus consisted of a metal funnel, terminating at the foot in a short cylindrical outlet, in which was inserted a shallow removable cup, on the bottom of which the wire gauze was mounted. This was 25 mm. in diameter, and might be of any desired mesh. The water under pressure was supplied by a tube, fitted with a nozzle designed to discharge a spreading jet through the sieve, and the tube was so arranged that the distance of the orifice in relation to the sieve could be adjusted. The tube was provided with a filter to ensure the removal of any solid particles from the water, which would otherwise vitiate the results.

Mr. NOEL HEATON, in discussing "The Influence and Elimination of Coarse Particles," classified particles, as regards size, into three groups: coarse, over 60 microns in diameter; intermediate, between 10 and 60 microns; fine, under 10 microns. In most pigments the "intermediate" and "coarse" particles were only present to the extent of a few per cent., and as regards paint manufacture, the machinery now in vogue was capable of eliminating the coarse particles—which were either reduced between the grinding surfaces or thrown out—whereas the "intermediate" ones passed through without reduction, and were dispersed with the fine particles in the finished article. He had formed the opinion that in paint manufacture—and more particularly with such materials as gloss enamels and nitro-cellulose lacquers—it was the "intermediate" particles which had a disturbing influence on the product. There could be no doubt that under modern conditions it was the job of the colour maker to eliminate everything but fine particles from his product. The province of the paint, and more particularly the rubber manufacturer, was not so much grinding as the study of problems involved in the dispersion of fine particles in various media.

The following papers were also read: "Particle Shape," by Dr. P. Schidrowitz; "Particle Size Effects in Rubbers Subjected to Repeated Stress," by Mr. T. R. Dawson; and "Detection of Grit in Rubber Pigments," by Mr. E. A. Murphy.

Discussion

The CHAIRMAN, opening the discussion, said it was extraordinarily interesting to one who was working on purely scientific lines to come to such a meeting and discover the nature of the problems with which practical men were meeting. It was also interesting to find how closely the purely scientific and the practical drew together, for if there was one thing which was being discussed thoroughly in pure science, it was the nature of the surfaces, the form, and the behaviour of fine particles. Speaking from the point of view of a pure scientist engaged in the examination of a good many of the points raised, with the aid of X-rays, he said that with X-rays we could examine things 10,000 times finer than with a microscope. In discussing the influence of fine particles the meeting was following the universal tendency of going into fine details in order to find out what was happening. It could not be otherwise than that X-rays, which helped us to deal with very small things, should offer a new means of illumination. He was sure, from what he had heard that morning, that X-rays were within the range of application to research work.

One of the most curious things found in all imperfectly crystalline bodies was that in nearly every body in which there was any sign of life or any sign of mechanical treatment, there was generally some tendency for crystals to form. In cotton, silk, rubber, or teeth, they found crystal orientation because of mechanical treatment or growth. X-ray photographs of stretched rubber showed that some of the molecules had arranged themselves and formed crystals, so that whereas in unstretched rubber there was practically no sign of crystalline matter, in stretched rubber there was crystalline matter, though how much was not quite certain. He believed that nearly the whole of it had become practically one crystal. The stretching of rubber involved arrangement, and X-rays at once told them about arrangement. It seemed to him that if fillers were put in they stopped that arrangement, and therefore, there was less extension of the rubber, greater hardness, and so on, so that the two things would naturally go together; indeed, he believed photographs had been taken which showed that when there was a filler present in rubber the crystalline formation did not take place, except in the case of one filler, namely, magnesium carbonate, in which it did take place rather easily.

The Application of X-Rays

He mentioned that point because it seemed to him that work with X-rays on crystals was drawing very near to technical application, and he wanted to ask whether it was safe to forget that. In other countries they were taking the matter up very seriously, and surely we ought to do so too. He did not consider it was safe to allow other nations to continue working with X-rays and to do nothing ourselves, which was practically what was happening. It might be that in the X-ray method of analysis the paint and rubber technologists had something of very material assistance indeed, and they ought not to let the opportunity go. They ought to co-operate and do all they could in submitting the rubber and paint problems to X-rays, just as was being done in Berlin, Amsterdam, and other places, for fear that they were letting something slip.

Mr. J. PARRISH congratulated Mr. Gallie and Mr. Porritt on the invention of a very useful piece of apparatus, representing a distinct advance on any method of screening previously put forward. From his own observations of so-called "standard" screens, he could fully appreciate the value of using only a small area. By the use of this apparatus the screening operation had been standardised to a far greater extent than had hitherto been possible, but there still remained the bigger problem concerned in the production of the standard screens themselves, not only for laboratory and specification purposes, but for use on the large scale.

Professor T. M. Lowry, Dr. Green, and Dr. Geoffrey Martin also took part in the discussion.

Discussion on Power Alcohol

Fresh Light on the Liquid Fuel Problem

On Thursday, July 22, a joint meeting arranged by the Chemical Engineering Group with the Institution of Petroleum Technologists and the Institution of Chemical Engineers discussed "Power Alcohol." The chair was taken at first by Sir Thomas Holland, F.R.S., and later by Sir Frederic Nathan.

Sugar from Wood

A paper on "Sugar from Wood" was read by Dr. W. R. Ormandy. He stated that it had long been known that sugar could be obtained by the hydrolysis of wood cellulose, but so long as it was necessary to use dilute acids under pressure there seemed little prospect of any economically sound process being developed. The process about which the most had been heard and with which probably the most work had been done was that of Classen, but although this was employed during the war, when cost was of minor importance, it did not seem to have been able to persist in the face of economic competition. Dangivillé, in 1880, suggested the action of gaseous hydrochloric acid upon wood, and Willstätter in 1913 showed that there was a very great difference in the action of commercial 35–36 per cent. hydrochloric acid on sawdust as compared with the action of 39 per cent. hydrochloric acid solution. Willstätter's discovery formed the basis of the Rheinau process. In 1920 Terrisse and Levy, of Geneva, made use of the 40 per cent. hydrochloric acid solution, but employed in addition gaseous hydrochloric acid. The process was referred to in this paper as the Prodor process. More recently, patents had been taken out by Classen which were practically identical with those described above, save that he claimed the additional use of metallic catalysts.

The Rheinau Process

This process, the simplest known to this time, was a large-scale development of the original Willstätter patents, sawdust being treated by six times its weight of 40 per cent. hydrochloric acid. The plant required was comparatively simple: a sawdust dryer which reduced the water content to 0·5 per cent. and a system of transport to a battery of 18 diffusers; an installation for making 40 per cent. hydrochloric acid and the recuperation of the gaseous acid, and the plant for separating the sugar from the acid and drying the sugar. The strong sugar solution finally obtained was evaporated in an apparatus similar to that employed for the production of milk powder. The resulting powder contained approximately: sugar 89 per cent., acid 2 per cent., salt 2 per cent., and water 7 per cent. It was a biscuit-coloured, extraordinarily light and hygroscopic powder dissolving in water to give a dark brown-black solution which required to be treated or purified according to the purposes to which it was to be put. Many problems arose in the development of this process, apart from the difficulties of concentration and drying. A special modification of the method was called the L-K modification, in which the sugar acid solution was drawn off from the diffusion battery at a suitable point, saturated with strong hydrochloric acid gas and again returned to the battery. This resulted in a number of fresh difficulties.

The Prodor Process

This process required the following plant: the mixer, the digester, the dryer-recuperator and the diffusion-battery. In this process no difficulty was experienced with the mixer, but the digester and dryer-recuperator made calls which could not be met by any of the materials hitherto employed in chemical technology. It was the discovery of what was essentially a new material which rendered the process even a possibility. It was known that a sort of concrete could be made using quartz particles of various sizes from dust up to material passing through a ½ in. screen, admixed with 8–12 per cent. of pitches which were inert to HCl. Unfortunately such material still exhibited in a diminished degree one of the properties of pitch, as it slowly deformed even at ordinary temperatures under a continually applied pressure. Dr. Levy, however, discovered that it is possible to make gas-works pitch, which up to temperatures of even 125° C. behaved strictly as a solid, and did not flow under continually applied pressure. The product, "Prodorite," was a pitch concrete made with specially prepared pitch of this character. The digester employed in Geneva resembled a Ridge pyrites furnace and was a monolithic structure, some 30 ft. high and 12 ft. in diameter, provided with plates having internal openings through which water could be circulated. Steel scrapers covered with ebonite gradually passed the material from top to bottom, continuously exposing large new surfaces for gas absorption. Obviously the mechanical difficulties were very great in a plant of this type, and although great ingenuity was shown in getting over them, it soon became evident that some combination of the best in the Rheinau and Prodor processes had to be worked out.

Combined Process

As the name indicates, this process consists of a combination of the principles of the foregoing processes, using the saturation with the gas of the Prodor process and the diffuser battery of the Rheinau. It was tried both with and without a digester. Prodorite was employed in the construction of the diffusion battery and oil evaporator.

Finally, some tests were carried out on the Classen process. The Classen patent appeared to cover the Willstätter as well as the Terrisse and Levy patents. How a catalyst was to be employed which was insoluble in the acids employed, and yet must come in contact with a finely divided bulky material like sawdust, was not easy to understand. So far as the experiments went, and they were being continued, there was no evidence that the use of these so-called catalysts produced any beneficial result.

Mr. Vyvyan Board said he could only speak on the economic aspect of this problem as one who had been engaged on behalf of the Distillers Co. and the International Sugar and Alcohol Co., which was a subsidiary company, to investigate the economic possibilities of this process. The power alcohol problem resolved itself into three lines of investigation. First of all, it was necessary to consider the availability and price of other liquid fuels. His own view was that alcohol, for some years at any rate, would not be in competition with petrol, but would be an adjunct to it. Secondly, there was the question of a sufficient supply of raw material at a commercial price and also the need for a location which was possible for distillation; and, thirdly, the investigator must be assured that there was a local market for the fuel produced. As far as England was concerned some source of power alcohol other than molasses would have to be looked for.

Sir Charles Bedford said that he had examined on the spot the Prodor process of Geneva and the Rheinau process, which he believed was fathered originally by the Goldschmidt Co., of Essen. These processes, no hint of the possibility of the commercial exploitation of which had been given at the meeting, were of considerable interest some years ago before the very marked advance made by that veteran investigator, Dr. Classen, who at the age of over 80 years had produced a revolutionary process. The process had been more or less secret hitherto, but there were certain points which he could usefully touch upon. The new Classen process was entirely different from all the preceding processes which Classen had patented or put on the market. It had revolutionised our conceptions of the relation of temperature and pressure to the production of sugar from cellulose by acid. The plant used now was a vastly simpler installation than anything that had been described by Dr. Ormandy, and the point which was of most importance, possibly, was that in addition to a great simplification of procedure there was an enormous diminution of the time required for the completion of the process. Again, the preparation of the acid and the method of its employment were novel, and lastly, special methods of using catalysts had been devised by the inventor. They had distinctly enhanced the yields, and the yield obtained with catalysts by Classen were much in excess of those stated in the paper.

Alcohol Motor Fuels

A paper entitled "Experiences with Alcohol Motor Fuels," by Mr. J. D. Ross and Dr. W. R. Ormandy, was then read. A large number of tests were described. The authors finally

stated that economic considerations pointed to the first utilisation of alcohol fuels in tropical and sub-tropical countries where sugar, starch and cellulose were rapidly and cheaply produced. The first really large scale experiment on these lines was being carried out in Queensland, Australia, where a plant for the production of 2,000,000 gallons of fuel per annum was now being erected and the necessary steps were being taken for the erection of three further plants. The raw materials to be employed in these plants were molasses from the sugar plantations and starchy products such as cassava or sweet potato, to be grown as alternative " cleaning " crops in rotation with the sugar cane. This venture was supported by the Queensland Government.

Active experimental work was being carried out with fermentation processes for the production of motor fuels from green cellulose and the conversion of the cellulose from sawdust into fermentable bodies. Having regard to the fact that one part by weight of alcohol had twice the anti-detonating power of one part by weight of motor benzole, it was by no means impossible that a motor fuel containing small percentages of alcohol should be put on the market in this country. The problem was largely one of distribution, but for motor cyclists there was no question but that alcohol mixtures were superior to any others. They had to remember that the amount of benzole available for mixing with petrol in this country was dependent upon the steel trade to a large extent, and the average amount available if used in the proportion chosen by the average tourist trophy racer would not suffice to supply the motor cyclists of this country, let alone leave anything over for the larger market to satisfy the motor-car users.

Discussion

Mr. E. Shrapnell-Smith, speaking from the point of view of a motor owner and particularly as President of the Commercial Motor Users Association, said that in earlier days everybody's mind seemed to be turned upon the use of a completely alcohol fuel or a completely hydrocarbon fuel and not, as now, on the possibilities of an admixture of alcohol and petrol. We now imported 500 million gallons of petrol annually, some, admittedly, refined here, whilst the total production of industrial and power alcohol was not more than 10 million gallons per annum. This emphasised the scope and necessity for close consideration of the facts in the paper.

Dr. W. R. Ormandy, replying to the discussion, said that Mr. Shrapnell-Smith had raised a question which had been in the minds of chemists for a long time, viz., was it possible to find some substance which, added in small quantities, would bring about the admixture of 95 volume per cent. alcohol with petrol or benzol? The answer was distinctly in the negative from the practical point of view. The ideal mixing agent was acetone. It had a high vapour pressure and a higher heat value than alcohol, and if it could be produced in quantity it would solve all our troubles. Although modern methods of producing synthetic methyl alcohol by pressure were of no interest to us from the point of view of motor fuel, they were of great interest in that they might produce crude methyl alcohol which would be suitable for denaturing at prices lower than had hitherto been paid for the alcohol produced by wood distillation. The work on wood sugar had been carried out with two objects, and one was that of ascertaining the possibility of producing molasses which could be used as a cheap source of raw material for making alcohol. They were going to make those cheap molasses not by converting the whole of the cellulose from the sawdust into sugar molasses but by producing a certain quantity of high grade glucose which would be sold at a much higher price, the unrefinable residue being used as molasses.

In all probability the fuel mixtures that would be employed in Australia would have a small amount of ether, not because it was a good fuel because it would bring the detonation value down, but because there was so much alcohol in it that it would stand any compression likely to be obtained commercially. As to the production of methyl alcohol synthetically, it was a peculiarity of methyl alcohol that it had a very low compression value and was, in that respect, a very bad fuel, added to which was the fact that it had about two-thirds the heat value of ethyl alcohol and little more than one-third the heat value of petrol. Therefore, even if it could be produced cheaply, it was outside the realm of practical politics as a motor fuel.

Result of Bradford Dyers' Action

Judgment by Consent

In Mr. Justice Tomlin's Court in the Chancery Division, on Friday, July 23, there came before his Lordship, as motions for judgment in default of defence, three actions, arising out of the general strike, brought by the Bradford Dyers' Association, Ltd., against the National Union of Textile Workers, the Amalgamated Society of Dyers, Bleachers, Finishers, and Kindred Trades, and the National Union of General and Municipal Workers. The details of the dispute, as affecting the Amalgamated Society of Dyers, were described in the Dyestuffs Monthly Supplement of The Chemical Age on May 22. It will be remembered that the operative dyers in the Bradford district connected with the Amalgamated Society were called out on strike, and that afterwards the men employed by the Bradford Dyers' Association were not permitted to return to work at once and unconditionally. As a result of negotiations terms of settlement were agreed upon. According to these terms, the men were to be taken back as soon as work could be found for them, but the legal rights of the Association were in no way prejudiced by this, and they intimated their intention of instituting legal proceedings against the Amalgamated Society to enforce their rights under the existing agreement. They indicated, however, that if work were resumed, and the dyers' society consented in open court to a declaration that the agreement was binding on both parties until legally terminated they would forgo all claims except £100 and their full costs.

Mr. Gavin Simonds, K.C., who appeared with Mr. Armitage for the plaintiffs, said the actions would be taken together. They arose out of the recent general strike, and related to a contract between the plaintiffs and the defendants. The matter came before his Lordship on a motion for judgment upon admissions upon agreed minutes. The contract was dated July 1, 1914, and was for the harmonious working of this industry, and in particular it provided that the Association should not cause or promote any lock-out of its employees during the continuation of the agreement, nor should the unions concerned advise or support any strike of employees while the agreement remained in force. That term of the contract was unfortunately breached during the general strike—a time when judgment was clouded, but it was only for a short time. The unions took the sensible course of sending their members back to work, and they went back upon the terms that the rights of the Association in respect of the breaches which had occurred should be preserved. It was consistent with the spirit of the working of this agreement that the defendant unions should admit that they had committed breaches.

Both parties, said counsel, were anxious that the integrity of the agreement should be preserved in the future, and they came before his Lordship on admissions by both sides that the agreement was of full force and was binding upon them, and on an admission by the unions that breaches had been committed, and he asked for an order on each of the unions for the payment of a certain sum as damages. In the case of the Amalgamated Society, a nominal sum of £100 had been fixed. He said nominal because, of course, the damage incurred was beyond all calculation. In the case of the other two unions the sum of £10 had been fixed, and it was proposed to take an order in each case for payment.

His Lordship said the judgment in each must be by consent.

Sir Henry Slesser, K.C., who appeared with Mr. Arthur Henderson for the Amalgamated Society, said it only remained for him to agree to the minutes as put before his Lordship. At the same time, he added, this result was based solely on the contract between the parties. Nothing that was done there could be said to be anything in the nature of a test case, as he believed had been suggested.

His Lordship agreed that it was nothing of the sort. He understood that it was simply a case of two parties entering into a contract and showing a very proper spirit in agreeing to be bound by it. Why should it be a test case?

Sir Henry Slesser said that certain persons outside had suggested that it was.

Mr. Alfred Short, M.P., on behalf of the National Union of Textile Workers, and Mr. Cohen, for the National Union of General and Municipal Workers, formally consented to judgment as agreed and endorsed the remark of Sir Henry Slesser.

Colour Users' Association Annual Meeting

Mr. Sutcliffe Smith's Review of the Position

The annual meeting of the Colour Users' Association was held on Tuesday in Manchester, Mr. H. Sutcliffe Smith, the chairman, presiding. In moving the adoption of the report (discussed in last week's issue of THE CHEMICAL AGE) and accounts for the year ended April 30, 1926, the Chairman touched on a number of very important points.

The following table was given as a summary of the quantities and values of the licences granted during the period from the commencement of the activities of the Dyestuffs Advisory Licensing Committee, in 1921, to 1925.

LICENCES GRANTED.

Year.	For importation from Germany. lb.	Value. £	For importation from Switzerland. lb.	Value. £	For importation from other sources. lb.	Value. £	Total. lb.	Value. £
1921	671,032	197,466	1,796,754	763,299	209,719	82,056	2,677,505	1,042,821
1922	1,325,671	375,675	1,638,235	694,740	270,987	33,404	3,234,893	1,103,819
1923	1,817,571	493,499	1,412,616	459,861	461,253	36,177	3,691,440	989,537
1924	1,805,145	398,226	1,191,931	363,513	39,158	9,204	3,036,234	770,943
1925	2,175,262	334,749	1,157,270	307,754	66,522	9,081	3,399,054	651,584

These figures did not indicate the actual tonnage of dyewares imported as they were exclusive of the colour imported from Germany as Reparation, the total quantity of which was upwards of 8,000 tons. 1925 might be taken as a representative year as no Reparation colour has been requisitioned during that period. The quantity licensed in 1925 was the highest recorded during the five years under review, with the exception of 1923, although the value showed a marked falling off. Since the expiry of the Reparations arrangement under the Versailles Treaty on December 31, 1924, no Reparation colour had been requisitioned by the United Kingdom. It would be much more satisfactory to all parties when the remainder of stock, about 450 tons, had been cleared. That it had only been necessary during 1925 to issue licences for approximately 1,500 tons of dyewares, whereas pre-war the importations (including intermediates) aggregated 18,390 tons, was undoubtedly an indication of considerable progress on the part of the British makers.

The Chairman of the British Chemical and Dyestuffs Traders' Association in his recent annual speech had made some very serious criticisms of the work of the Licensing Committee and suggested that the Dyestuffs (Import Regulation) Act was being abused, and used as a spy organisation to filch business connections. He (Mr. Smith) protested against such an unfair accusation. The Committee consisted of five representatives of the colour using industries, three of the dye manufacturing industries and three independent members, and under such a constitution every opportunity was afforded for the consideration of the interests of all concerned.

The I.G. and Its Lesson

The developments which had occurred since the last annual meeting had been phenomenal in the history of the chemical industry of the world, for no time could have seen such consolidation and expansion as that which had been observed by those who followed the German industry. These developments were leading not only to a far greater application, in Germany, of manufacturing methods at present almost in their infancy in this and other countries, meaning greater and greater substitution of synthesis for nature, but were giving to that country an ever-increasing independence of foreign sources of supplies of essential materials which was sure to react on the whole of German industrial and social life. Accounts which had recently appeared indicated nearly 80 firms, not all German, which were closely associated in or with the Interessen Gemeinschaft. The lesson was consolidation of interest, research on wide lines, and production in big units.

There was evidence of continuous progress in the British dyemaking industry, not so much in spectacular fashion as by a steady movement towards better things. He made an appreciative reference to the reorganisation of the British Dyestuffs Corporation and its favourable results. In certain wares there had been considerable competition among dyemakers, which had been reflected in a steady fall in their prices. There was a development of the facilities for rendering better technical service to consumers and a definite display of inventive skill in solving the new problems which faced users. The new colours for the dyeing of artificial silk (cellulose acetate), the commercial production of a range of soluble anthraquinone vat dyes and the rapid production of such colours as Alizarine Supra Blue, were the evidences which he had in mind. These, undoubtedly, showed clever research work and a quickening of effort on the part of British makers to bring their services into line with those of their foreign competitors. He hoped this progress would be continued until the permanent existence of the British dyemaking industry was beyond all reasonable doubt.

Importance of Research

He emphasised the vital importance of fundamental research which might be lost sight of in the competitive field. He was not sure that work of this kind was really being done and that provision was being made for it. Professor Thorpe had on several occasions drawn attention to this aspect. Although much had been done during the past five years by the British makers in the production of new types of dyes, yet when one made a detailed survey of what had actually been accomplished there were comparatively few new dyewares actually in use compared with a decade ago.

A deputation had visited France, Italy, Germany, and Belgium with a view to finding whether, as regards the price of dyestuffs, users in this country were at a disadvantage in comparison with their competitors in the countries named. Many hundreds of prices had been obtained from the various countries visited and whilst it was difficult to make an absolutely accurate and definite comparison, owing to varying conditions, it had been clearly established that the general level of prices on the Continent was lower than here, especially for the better types of colours. In competitive colours of the ordinary well known types, the prices ruling in this country, due to domestic competition, were on a keen basis; but as the colour using trades were very rapidly extending the use of the better and dearer types, the British user was unduly penalised, unless the price of these better types was brought down, not only to the level of the prices paid by Continental competitors, but to the lowest price at which they could be produced on an economic scale, and to a price more approximating to the general economic level of commodity prices. The general level of dyestuffs prices was high, not only here but on the Continent, and, unlike most commodities, the prices in the post-war period had not yet reached the level of average wholesale prices in Europe.

International Action by Dyestuff Users

The outstanding feature of the inquiry was undoubtedly the fact that connection had been established officially with Continental users. There were users' associations in most textile producing countries on the Continent, and whilst these associations did not function in the buying of raw materials, he believed that if necessity arose, they would be the means of linking users together internationally. It was recognised, not only here but on the Continent, that in view of the possible extension of amalgamations and conventions of dyemakers, it might be desirable at no distant date for users to meet at regular intervals for the protection of their interests.

Last year he devoted considerable attention in his speech to the question of prices ruling in this country for dyewares. He was glad to report that there was a general tendency for prices to fall, and the average was now on a lower level than a year ago; but the general level of dyestuffs prices was yet too high.

The following figures giving the average price per lb. of imported finished coal tar dyestuffs, exclusive of alizarine and synthetic indigo, showed a decidedly lower tendency :—

Year.	Pence per lb.	Per cent. increase over 1913.
1913	11·7	—
1920	79·2	577
1921	66·7	470
1922	65·8	462
1923	49·8	326
1924	58·25	398
1925	42·99	267

The actual importation of finished dyestuffs from 1920 to 1925 was as follows :—

Year.	Tons.	Value. £
1920	10,397	7,552,799
1921	2,985	1,539,406
1922	2,880	1,326,174
1923	2,808	1,004,482
1924	3,557	1,339,729
1925	1,981	646,903

The Fastness of Dyestuffs

Referring to the question of fast and fadeless dyeing, Mr. Smith stated that demands were being made on dyers and printers to give guarantees which were quite impossible of fulfilment, as in many cases, whilst the very best available dyestuffs were used, even these did not fulfil the standard that was expected and demanded. It would be invidious for an individual dyer or printer to take action in this matter, but it would be a very suitable subject for the trade to take concerted action, not only in defining their position but in resisting unreasonable stipulations from their customers. The trade and the public seemed to expect that the guarantee given for vat dyes on cottons could be given for any other fabric, whereas with the present dyewares available this was quite impossible, and a definite understanding with the trade should be reached.

The report and accounts were adopted.

Pitch-Binder Concrete

To the Editor of THE CHEMICAL AGE.

SIR,—With reference to the report in your issue of July 24 of Sir Max Muspratt's speech in opening the Chemical Plant Exhibition, we notice that you have misreported his remarks with reference to our material. On line 9 of page 74 reference is made to " pitch-lime concrete " ; what Sir Max Muspratt said was " pitch-binder concrete." We need hardly point out to you that there is no lime in our acid-resisting material, and we should be greatly obliged if you would correct in your next issue the wrong impression that might be created by this mistake.—Yours, etc.,

PRODORITE, LTD.,
J. H. WEST.

Gas Light and Coke Company's Extension

FOLLOWING the opening of the Gas Light and Coke Co.'s coal-handling plant at Beckton, Sir Philip Cunliffe-Lister, president of the Board of Trade, with Lady Cunliffe-Lister, inaugurated at the company's Fulham works an extension of the gas-making, purifying, and storage plants, which are large enough to supply all the gas used by cities as large as Plymouth, but, in fact, provide for no more than one year's average increase in the company's sale of gas. The guests were received by Mr. D. Milne Watson (Governor of the Gas Light and Coke Co.) and Mrs. Milne Watson, and the directors of the company. Sir Philip Cunliffe-Lister, in reply to the welcome extended by the governor, remarked that the Gas Light and Coke Co. during more than a century of work had passed from the status of an undertaking to that of an institution. The gas industry not only occupied a great place in the domestic life of the country, but it was a tremendous industry in itself. Something like £170,000,000 was invested in it ; it had over 8,000,000 customers, and consumed more than 17,000,000 tons of coal every year. He would be a superficial observer who said that the age of gas was past.

Operation of B.D.C. Student Training Scheme

IN accordance with the scheme of giving students some insight into technical chemistry, in order to supplement their academic training, fourteen university students are spending a month of their vacation working at the Blackley (Manchester) works of the British Dyestuffs Corporation. The scheme permits the young chemist to observe chemical technology and engineering under commercial conditions, thereby enabling him to decide whether he is fitted for such a vocation. The students come from all over the country. Another group will come in September. The number of applications was three times as many as could be coped with.

Chemical Matters in Parliament

Irish Free State (British Patent Rights)

Mr. Ormsby-Gore (House of Commons, July 21), replying to Sir W. Davison regarding the recent decision in the High Court of the Irish Free State in Dublin, which lays down that British patent rights are no longer valid in the Free State, said that His Majesty's Government had been in communication with the Government of the Irish Free State in the matter, and were informed by them that notice of appeal against the judgment in question had been entered, but that it was doubtful whether it would be possible for the appeal to be heard before the autumn. His Majesty's Government were further informed that the Minister for Commerce and Industry had on Tuesday introduced into the Dail a Bill declaring the validity in the Irish Free State of all patents registered in the Patent Office, London, prior to December 7, 1921.

Spirits (Prices)

Mr. Montague (House of Commons, July 21) asked the President of the Board of Trade whether he could furnish information as to the wholesale prices, both for inland and export sale, of methylated spirits, alcohol used for industrial purposes, whisky, brandy, gin and rum ?

Sir B. Chadwick said he had no information as to any differences between the prices of the varieties of spirit mentioned, for inland sale and for export, nor regarding the wholesale prices of potable spirits. The wholesale price of industrial methylated spirit (ordinary), 64 per cent. over proof, was at the rate of 3s. per gallon, and that of mineralised spirit (coloured violet), of the same strength, at the rate of 4s. 1d. per gallon.

Scottish Dyes

Mr. Sandeman (House of Commons, July 26) asked the President of the Board of Trade if Scottish Dyes, Ltd., a subsidised company, had sold their patent rights to manufacture Jade Green on the Continent to the Interessen Gemeinschaft, in Germany ; and whether he was aware that this new colour was being sold by the Interessen Gemeinschaft on the Continent at considerably less price than Scottish Dyes were selling it in this country ?

Sir B. Chadwick said he had been informed that Scottish Dyes, Limited, had licensed the Interessen Gemeinschaft to manufacture Jade Green, but he had no information as to the price of this dyestuff on the Continent.

Mr. Sandeman then asked if he was aware that this was one of the few brilliant things that Scottish Dyes had accomplished, and that by the sale of it to the German combine the export of our cloth to the Continent had been absolutely stopped, with the result that there was unemployment in Lancashire ?

Sir B. Chadwick said that if Mr. Sandeman would give him detailed particulars he would look into the matter.

Captain Wedgwood Benn inquired what was the purpose of having a Dyestuffs Act to build up a dyestuffs industry in this country if the persons so protected then sold their rights to the Continent ?

Sir B. Chadwick replied that this was purely a matter of a Jade Green.

Defensive Gas Instruction

Mr. Ammon (House of Commons, July 26) asked the Secretary of State for War whether he was aware that prior to 1924 defensive gas instruction, including the use of box respirators, was not in use in the Army, and was resumed in 1924 ; and would he state whether such instruction was now given ?

Sir L. Worthington-Evans replied that Mr. Ammon appeared to be under a misapprehension. Training in anti-gas measures, including the use of respirators, has been given continuously in the Army since 1915.

Iron and Steel Industry

The Prime Minister (House of Commons, July 26), replying to Mr. Dixey, said the Government had no intention of altering their decision regarding the application of the iron and steel industry for the appointment of a committee under the Safeguarding of Industries procedure. With regard to the steps he proposed to take to preserve this trade for the nation he had nothing to add to his previous answers on the subject.

From Week to Week

LIGNITE COAL DEPOSITS under Berlin are estimated by experts to amount to 1,200,000,000 tons, an amount sufficient to supply that city with fuel for a century.

THE BRYMBO STEELWORKS, near Wrexham, are resuming operations. A supply of foreign coal has been arranged for, and five hundred men are to be taken on immediately.

PHOSPHATES IN LARGE QUANTITIES for the enrichment of prairie soils may soon be produced in British Columbia, owing to the reported discovery of large deposits in the East Kootenay district.

MR. MATTHEW MORRIS, assistant manager and chemist at the Blackburn Corporation Sewage Works, at Salmesbury, has been appointed manager and chemist at the Wigan Corporation Sewage Works.

PROFESSOR W. LASH MILLER, of Toronto, has been elected president of the Canadian Institute of Chemistry for 1926–27. The secretary of the Institute is Professor J. B. Ferguson, of Toronto.

SIR ALFRED MOND, chairman of the Mond Nickel Co., deputy-chairman of Brunner, Mond and Co., etc., has been appointed to serve on the Committee which has been set up to inquire into and report upon the desirability and practicability of developing co-operative selling in the coal mining industry and to make recommendations.

A MEETING of those who have intimated their support of the Institution of Fuel Technology and their intention to become members was held in the theatre of the Institution of Civil Engineers, on Friday, to approve the Articles of Association and the nominations of officers and council made by the organising committee pursuant to the resolution passed at the meeting held on March 5.

CIVIL LIST PENSIONS granted during the year ended March 31 last included: £125 to Mrs. Marian Dibdin, in recognition of the scientific work of her husband, the late Mr. William Joseph Dibdin, F.I.C.; and £100 to Mrs. Elizabeth Japp, in recognition of the services rendered by her husband, the late Professor Francis Robert Japp, F.R.S., LL.D., to the advancement of organic chemistry and chemical education.

THE I.G. FARBENINDUSTRIE board, at a meeting on Saturday, July 24, approved the plan of a fusion of interests with the Köln-Rottweil A.G. and agreed to the conclusion of agreements with the Dynamit A.G., formerly Alfred Nobel, and the Rheinischwestfälische Sprengstoff A.G. The extent of the necessary increase of capital has not yet been settled owing to the large new schemes and works under consideration.

PROFESSOR PAUL SABATIER, a member of the Institute of France, and a foreign member of the Royal Society, was presented by the Duke of Connaught with the Royal Society of Arts' Albert Medal, on Thursday, July 22, "in recognition of his distinguished work in science and of the eminent services to industry rendered by his renowned researches in physics and chemistry, which laid the foundation of important industrial processes."

PROFESSOR J. A. FLEMING, F.R.S., is retiring on August 1 from the chair of electrical engineering at University College, London, a position which he has occupied since its foundation in 1885. Professor Fleming, who is 77 years of age, has made a large number of original contributions to our knowledge of electrical phenomena and physics generally, and is the discoverer of the thermionic valve, which revolutionised wireless telegraphy and made wireless telephony possible.

DR. ROBERT COOPE, lecturer in bio-chemistry in the University of Liverpool, and senior hon. assistant physician at the Royal Southern Hospital, Liverpool, has been awarded the "Roger's Prize" by the University of London. The prize, which is of the value of £100, and is open to any qualified medical man in Great Britain and Ireland, is awarded every three years for a monograph on some specially set subject. The subject for this year was "The value of the various methods in the diagnosis of diseases of the pancreas.

THE INSTITUTE OF PHYSICS has issued its report of the board for 1925. The corporate membership at the end of 1925 was 441 as compared with 428 in 1924, while the total membership roll, including fellows, associates, ordinary members, and registered students, was 530. A scheme has been prepared by which facilities will be given to corporate members to borrow instruments or apparatus for purposes of research in circumstances (such as the short time the apparatus is required) where purchase is not desired.

GIVING EVIDENCE AT A MIDDLESBROUGH INQUEST, on Saturday, July 24, on James McFarlane, aged 51, of Lower Gosford Street, who collapsed and died while unloading manganese ore from a ship at Middlesbrough Docks the previous day, a stevedore's labourer said that the deceased's only complaint was the complaint of them all that the dust from the ore was killing them. Dr. Jones attributed death to heart failure and added that the dust from the ore had nothing to do with the man's collapse. A verdict in accordance with the medical evidence was returned.

MR. J. G. JACKSON, a patentee of filling and grinding machines, has been appointed to the technical staff of Nobel Industries.

THE GERMAN STEELWORKS UNION and the French steelworks are reported to have resumed negotiations in Cologne, with the object of making an international cartel.

MISS NORA MOND, daughter of Sir Alfred and Lady Mond, was married to Mr. John Buckland, of Edgbaston, at Holy Trinity Church, Sloane Street, London, on Saturday, July 24.

THE I.G. is contemplating increasing its capital in connection with its fusion with the explosives group. There are rumours of impending closer connections between the trust and the Ufa Film Co.

IN REPORTING A FIRE at a chemical works in Ash Grove, Hackney, recently we stated that "fire snow" extincteurs were used to cope with the outbreak. We are now informed that Foamite Firefoam was actually used.

SIR WILLIAM BIRD, senior partner of Messrs. Bird and Bird, solicitors, London, has been appointed Chairman of the Staveley Coal and Iron Co., in succession to the late Mr. Charles P. Markham. Sir William has been a member of the Board for some years.

THE SCIENCE MUSEUM REPORT for 1925, just issued by the Board of Education and published by the Stationery Office (Price 1s. net), states that the number of visitors admitted to the museum galleries during the year was 429,558, a somewhat smaller number than in 1924.

THE FOLLOWING APPOINTMENTS HAVE BEEN MADE in the University of Manchester: Lecturer in Applied Chemistry in the faculty of technology, Dr. O. R. Howell; Demonstrator in Applied Chemistry in the faculty of technology, Mr. R. Grindley; Lecturer in Tutorial Chemistry and Dyestuffs in the faculty of technology, Dr. F. A. Mason; Assistant Lecturer in Chemistry, Dr. A. Robertson.

APPLICATIONS ARE INVITED for the following appointments: Lectureship in physical chemistry in University College, Dundee, £500. The Secretary and Registrar. August 16.—Chemical pathologist and lecturer in chemical pathology in the St. Bartholomew's Hospital and Medical College. The Dean of the Medical College. August 16.—Lecturer in biology and chemistry in the Municipal Technical College, Swansea. Technical school Burnham scale. The Director of Education, Education Office, Dynevor Place, Swansea. August 9.

RECENT WILLS INCLUDE: Major Thomas Chester Ansdell, of Pendleton, Lancs, lately managing director of Blair, Harrison and Co., manufacturing chemists, of Kearsley, Bolton, £90,883.—Professor William James Lewis, F.R.S., Professor of Mineralogy at Cambridge and Senior Fellow of Oriel College, Oxford, who died on April 16, aged 79, left estate of the value of £21,477, with net personalty £18,216. He left to the Mineralogical Museum, Cambridge, such of his books and scientific apparatus as his successor, or the demonstrator for the time being, may select; the balance to be offered to Bedford College for Women, London, to select such books as may be useful to the students.

DR. W. H. GIBSON, O.B.E., F.I.C., F.INST.P., has been appointed Director of Research for the Linen Industry Research Association, in succession to Dr. J. Vargas Eyre. Dr. Gibson was educated at University College, London, under Professor Sir William Ramsay, and is Doctor of Science in chemistry of London University. He spent twelve years at the Research Department, Royal Arsenal, Woolwich, and for his services in connection with high explosives research during the European War was awarded the M.B.E. in 1918 and the O.B.E. in 1920. For the last seven years Dr. Gibson has held a responsible position in the linen industry, having been in charge of the research department of one of the most prominent linen firms in Belfast.

Obituary

C. C. SPEIDEN, of New York, aged 60, manufacturer and importer of chemicals.

S. P. WETHERILL, senior, aged 80, founder of the well-known dyestuff company in Philadelphia.

JOHN MCKAY THORBURN, in Johannesburg, aged 43. He had held the post of analytical chemist to the State mines.

SIR JOHN ROPER WRIGHT, of Bath, an honorary member of the South Wales Institute of Engineers and a pioneer of the open hearth process of steel making.

MR. JOHN WILLIAM KING, of Sheffield, one of the pioneers of the steel trade in that city, and for forty years chief steel maker at Bayley's Steel Works, during which period he was closely associated with Professor Arnold in his various researches on steel.

PROFESSOR ROBERT GNEHM, aged 74. From 1885 to 1894 he was director of the Society of Chemical Industry in Basle, from 1894 to 1899 Professor of Technical Chemistry in the Zurich Polytechnic, from 1899 to 1905 Director of the Polytechnic, and thereafter President of the Swiss School Board. His experimental investigations included work on dyeing processes, on the impurities and weighting of silk and on various dyestuffs (methylene blue, Auramine G, etc.).

References to Current Literature

British

ACIDS.—Nitrosylsulphuric acid. Part I. G. A. Elliott, L. L. Kleist, F. J. Wilkins and H. W. Webb. *Chem. Soc. Trans.*, June, 1926, pp. 1219–1232.

The chemistry of the glutaconic acids. Part XIX. J. Packer and J. F. Thorpe. *Chem. Soc. Trans.*, June, 1926, pp. 1199–1203.

AMINES.—Separation of the constituents of commercial-xylidine. G. T. Morgan and W. J. Hickinbottom. *J.S.C.I.*, July 16, 1926, pp. 221–222T.

COAL.—The cause of coking in coals. Part II. R. Quarendon. *J.S.C.I.*, July 16, 1926, pp. 483-487.

CORROSION.—The fundamental principles of corrosion. U. R. Evans. *J.S.C.I.*, July 23, 1926, pp. 504–508.

GENERAL.—The dyestuffs industry and the State. H. Levinstein. *J. Soc. Dyers and Col.*, July, 1926, pp. 213–218.

HYDROLYSIS.—The hydrolysis of starch by acids. D. R. Nanji and R. G. L. Beazeley. *J.S.C.I.*, July 16, 1926, pp. 215–219T.

The hydrolysis of guanidine. J. Bell. *Chem. Soc. Trans.*, June, 1926, pp. 1213–1219.

OILS.—A test for Chinese wood (tung) oil. E. R. Bolton and K. A. Williams. *Analyst*, July, 1926, pp. 335–338.

The unsaponifiable matter from the oils of elasmobranch fish. Part I. A contribution to the study of the constitution of squalene (spinacene). I. M. Heilbron, E. D. Kamm and W. M. Owens. *Chem. Soc. Trans.*, June, 1926, pp. 1630–1644.

OXIDATION.—Some physico-chemical and electro-chemical aspects of sulphur dioxide as an oxidising agent. S. R. Carter. *J.S.C.I.*, July 16, 1926, pp. 207–210T.

The oxidising properties of sulphur dioxide. W. Wardlaw. *J.S.C.I.*, July 16, 1926, pp. 210–214T.

REACTIONS.—The interaction of hydrogen and nitrous oxide on the surface of gold. W. K. Hutchison and C. N. Hinshelwood. *Chem. Soc. Trans.*, June, 1926, pp. 1556–1559.

The action of phosphorus on salts of silver and other metals. O. J. Walker. *Chem. Soc. Trans.*, June, 1926, pp. 1370–1381.

The action of thionyl chloride on hydroxyanthraquinones. Part II. Quinizarin. A. Green. *Chem. Soc. Trans.*, June, 1926, pp. 1428–1437.

United States

AMMONIA.—Feasibility of coke-oven hydrogen for synthetic ammonia. B. F. Dodge. *Chem. Met. Eng.*, July, 1926, pp. 416–420.

ANALYSIS.—The determination of traces of mercury. Part II. The quantitative determination of mercury in the presence of organic matter. H. S. Booth, N. E. Schreiber and K. G. Zwick. *J. Amer. Chem. Soc.*, July, 1926, pp. 1815–1823.

Hydroxylamine hydrochloride for the quick estimation of acetone. M. Marasco. *J. Ind. Eng. Chem.*, July, 1926, pp. 701–702.

FUEL.—The precise determination of aromatic hydrocarbons in gasoline. A. M. Erskine. *J. Ind. Eng. Chem.*, July, 1926, pp. 694–698.

Systematic refining of cracked distillates. Chemical factors in refining. J. C. Morrell. *J. Ind. Eng. Chem.*, July, 1926, pp. 733–738.

GENERAL.—The elimination of waste in industry. W. C. Wetherill. *J. Franklin Inst.*, July, 1926, pp. 1–22.

The practical aspects of research. G. J. Fink. *J. Ind. Eng. Chem.*, July, 1926, pp. 752–755.

The relation of light to life and health. W. A. Price. *J. Ind. Eng. Chem.*, July, 1926, pp. 679–685.

OXIDATION.—Oxidations in the benzene series by gaseous oxygen. Part I. Oxidation of methylbenzenes. H. N. Stephens. *J. Amer. Chem. Soc.*, July, 1926, pp. 1824–1826.

Catalytic and induced oxidation of some carbohydrates, uric acid and inorganic substances. C. C. Palit and N. R. Dhar. *J. Phys. Chem.*, July, 1926, pp. 939–953.

Inhibiting agents in the oxidation of unsaturated organic compounds. O. M. Smith and R. E. Wood. *J. Ind. Eng. Chem.*, July, 1926, pp. 691–694.

PIGMENTS.—The testing of paint pigments for transparency to ultraviolet radiation. G. F. A. Stutz. *J. Franklin Inst.*, July, 1926, pp. 89–98.

PLANT.—Suggestions for high-pressure research equipment. F. A. Ernst. *Chem. Met. Eng.*, July, 1926, pp. 413–414.

Fabricating heavy equipment by welding. A. O. Miller. *Chem. Met. Eng.*, July, 1926, pp. 410–411.

SILICATES.—Aqueous solutions of sodium silicates. Part III. R. W. Harman. *J. Phys. Chem.*, July, 1926, pp. 917–924.

TARS.—Dehydration and distillation of coal tars. C. H. S. Tupholme. *Chem. Met. Eng.*, July, 1926, pp. 421–422.

German

ACIDS.—The preparation of aqueous thiocyanic acid. W. Gluud, K. Keller and W. Klempt. *Ber.*, July 7, 1926, pp. 1384–1386.

Poly-glycuronic acids. Part I. E. Schmidt and F. Vocke. *Ber.*, July 7, 1926, pp. 1585–1588.

CEMENT.—The constitution of cement. E. Jänecke. *Z. Electrochem.* July, 1926, pp. 354–362.

ELECTRO-CHEMISTRY.—V2A steel for electro-analytical precipitations. A. Schleicher and L. Toussaint. *Z. angew. Chem.*, July 8, 1926, pp. 822–824.

Theory of the electrolytic formation of ammonium persulphate. O. A. Essin. *Z. Elektrochem.*, June, 1926, pp. 267–269.

GOLD.—On the question of the formation of gold from mercury, with regard to the experiments of Miethe, Stammreich and Nagaoka. E. Tiede, A. Schleede and F. Goldschmidt. *Ber.*, July 7, 1926, pp. 1629–1641.

On the alleged preparation of "artificial" gold from mercury. F. Haber, J. Jaenicke and F. Matthias. *Ber.*, July 7, 1926, pp. 1641–1648.

On the question of gold from mercury. E. Duhme and A. Lotz. *Ber.*, July 7, 1926, pp. 1649–1651.

PLANT.—The present position as regards acid-proof iron. T. Hoffmann. *Chem. Apparatur;* Part IV, June 25, 1926, pp. 139–140; Part V, July 10, 1926, pp. 152–154.

High-temperature heating by oil circulation. T. Hoffmann. *Chem. Apparatur;* Part I, May 25, 1926, pp. 115–118; Part II, July 10, 1926, pp. 154–155.

REACTIONS.—Chemical reactions in mixtures of solid materials at elevated temperature. G. Tammann. *Z. angew. Chem.*, July 22, 1926, pp. 869–875.

Investigation of the corrosion of aluminium by water. Part I. L. W. Haase. *Z. Elektrochem.*, June, 1926, pp. 286–289.

A new reaction between chloracetic acid, potassium cyanide and benzaldehyde. M. Henze. *J. prakt. Chem.*, July, 1926, pp. 212–224.

Thermochemical investigation of gas reactions. Part I. M. Bodenstein and P. Günther. *Z. angew. Chem.*, July 22, 1926, pp. 875–880.

SUGARS.—A stable γ-glucose. H. Pringsheim and S. Kolodny. *Ber.*, June 9, 1926, pp. 1135–1140.

Progress in sugar chemistry. H. Kiliani. *Ber.*, July 7, 1926, pp. 1469–1477.

SULPHATES.—Investigation of the separation of copper and iron vitriols by crystallisation. G. Agde and H. Barkholt. *Z. angew. Chem.*, July 15, 1926, pp. 851–855.

SYSTEMS.—Equilibria in systems of silica, alumina, lime and caustic soda. W. Eitel. *Z. Elektrochem.*, July, 1926, pp. 336–341.

VISCOSE.—Viscose artificial silk manufacture. Part III. The preparation of xanthogenates. E. Wurtz. *Chem. Apparatur,* June 10, 1926, pp. 126–128.

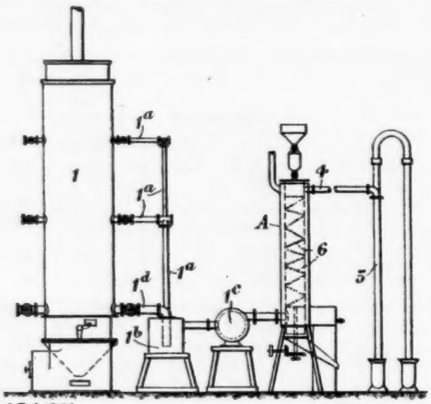
Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each

Abstracts of Complete Specifications

254,011. CONVERSION OF CRUDE MINERAL OR SHALE OIL OR TAR OILS INTO LIGHT OIL OR SPIRIT AND PREPARATION OF LIGHT OIL OR SPIRIT FROM COAL, LIGNITE OR OTHER CARBONACEOUS MATERIAL. E. Schultz, 124, Grey Street, East Melbourne, Victoria, Australia. Application date, March 25, 1925.

The carbonaceous substance or crude oil is heated in a retort or still and the gases passed into a converter containing lime



254,011

and other substances. The converted gases then pass to a condenser and the condensate is treated with an acid, neutralised, and fractionated.

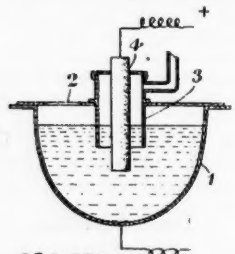
The material in the retort 1 is subjected to gradually increasing temperature, and the gases pass through pipes 1*a* from the upper zones to dust traps 1*b*, and then through exhausters 1*c* to the converter A. The heavier gases pass through the pipe 1*d* to a condenser only. The converter A is heated by the gases to a temperature below that in the retort. The converter may contain lime, together with one or more of the following: zinc, zinc oxide, zinc chloride, bauxite, aluminium chloride, and magnesia. These substances may be supported on trays, or by a rotating screw 6. The gaseous products pass through a pipe 4 to a condenser 5. The condensate is subjected to treatment with an acid, and is then washed and neutralised with caustic soda. A high proportion of light spirit is obtained.

254,021. BENZANTHRONE DERIVATIVES, PROCESS FOR THE MANUFACTURE OF. A. J. Ransford, London. From L. Cassella and Co., G.m.b.H., Frankfurt-on-Main, Germany. Application date, March 27, 1925.

This is a new process for obtaining benzanthrone derivatives, and also new derivatives. α-naphthalene-azobenzene-*m*-carboxylic acid or a substitution product is reduced to the hydrazo compound, and the α-naphthalene-hydrazo-benzene-*m*-carboxylic acid obtained is transformed in acid solution into the 4:4′-diamino-naphthylphenyl-2′-carboxylic acid, and this is condensed by an acid condensing agent to a benzanthrone derivative. Instead of condensing the *p-p′*-diamino-naphthylphenyl-*o*-carboxylic acid directly with condensing agents, the two amino groups may be replaced by the Sandmeyer method by hydrogen, halogen, hydroxyl, methoxyl, etc., and the products thus obtained condensed into derivatives of benzanthrone, halogen-benzanthrone, hydroxybenzanthrone, etc. The starting materials for this process are obtained by boiling with alcohol the diazo compounds of the azo dyes, which are formed by combining diazobenzene-*m*-carboxylic acid with naphthylamine or its derivatives. Only certain derivatives of α-naphthalene-azobenzene-*m*-carboxylic acid, which are specified, can be used in this process. Reducing agents such as stannous chloride, sulphurous acid, zinc dust, etc., may be used, and acid condensing agents such as sulphuric acid, chloro-sulphonic acid, zinc chloride, etc., are used for the final condensation. The derivatives obtained are intermediate products for the production of vat dyestuffs of the violanthrone and isoviolanthrone series. Examples are given of the production of 4:4′-diamino-naphthylphenyl-2′-carboxylic acid, diaminobenzanthrone, 4:4′-diamino-naphthyl-5′-methylbenzene-2′-carboxylic acid, diamino-methyl-benzanthrone, diaminomethoxy-benzanthrone, and others.

254,050. METAL, MORE ESPECIALLY MAGNESIUM, FROM THE CORRESPONDING METALLIC CHLORIDE, MANUFACTURE OF. C. Arnold, London. From the Dow Chemical Co., Midland, Mich., U.S.A. Application date, May 7, 1925.

Magnesium is obtained by the electrolysis of magnesium chloride containing water of crystallisation. The apparatus may consist of a cast-iron or steel vessel 1 containing the molten electrolyte and at the same time constituting the cathode. A cylindrical diaphragm 3 of fireclay or porcelain is supported from a cover 2 and surrounds the graphite anode 4. Anhydrous magnesium chloride is placed in the vessel 1, together with sodium and potassium chlorides, and is electrolysed. Chlorine is liberated at the anode, and is drawn off from the central compartment, and magnesium is liberated at the wall of the vessel 1 and floats on the surface. In this invention it has been found that the salt may be replenished with hydrated magnesium chloride if this is introduced into the anode compartment 3. If the hexahydrate is used, about 3 per cent. of powdered coke is added, but if the dihydrate is used, only a trace of powdered coke is necessary. The hydrated magnesium chloride may also be employed in the type of electrolytic apparatus in which the



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magnesium is received into a more electro-positive metal such as copper, aluminium, tin, and lead, and afterwards recovered from it by secondary electrolysis. This process may also be employed for the electrolysis of other hydrated chlorides, *e.g.*, beryllium chloride.

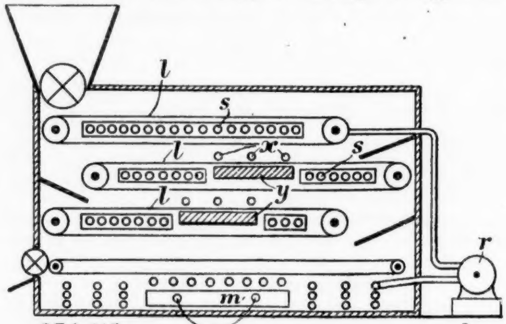
254,086. ARSENIC COMPOUNDS OF THE AROMATIC SERIES, MANUFACTURE OF. A. J. Ransford, London. From L. Cassella and Co., G.m.b.H., Frankfurt-on-Main, Germany. Application date, June 9, 1925.

Acylised amino-oxy-benzene-arsinic acids are reduced by sulphurous acid to their respective arsenious acids or arsenoxides. Examples are given of the production of 4-acetyl-amino-3-oxybenzene-1-arsenoxide, 3-acetyl-amino-4-oxybenzene-1-arsenoxide, 3-chloro-4-oxy-5-acetylamino-benzene-1-arsenoxide, 3-methyl-4-oxy-5-acetylamino-benzene-1-arsenoxide.

254,115. DISTILLING BITUMINOUS FUELS, METHOD OF. G. Pritzbuer, Georgsmarienhütte, Bezirk Osnabruck, Germany. Application date, July 24, 1925.

It has been found that bituminous substances such as coal may be subjected suddenly to a temperature considerably above the normal distilling temperature and will continue to swell and distil in a space which is at a lower temperature. This operation is repeated a number of times, yielding a

denser and more solid coke, with an economy in heating. The high temperatures may be applied to an inclined rotary retort by means of additional gas burners, or by surrounding zones of the retort by transformer rings so that the coal is subjected to induction currents. In this case, the difficulty due to bad conduction of the coal is avoided. In another form of retort, the coal is supplied through a hopper to the



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conveyer band *l* enclosing a pipe coil *s* through which heating fluid or fusible metal or salt is circulated by means of a pump *r*. The fluid is heated by burners *o* in a chamber *m*, for which purpose they are immersed in a bath of salt or molten lead. Metal plates *y* are enclosed by the second and third conveyor bands, and copper rollers *x* are placed above the plates, so that an electric current may be passed through the coal from the rollers *x* to the plate *y* to subject it at intervals to higher temperatures.

254,163. ELECTROLYTIC DECOMPOSITION OF ALKALI METAL CHLORIDE SOLUTIONS. Konigsberger Zellstoff-Fabriken und Chemische Werke, Koholyt Akt.-Ges., 75, Potsdamerstrasse, Berlin, W.57, and E. Schlumberger, 2, Mariendorferstrasse, Berlin-Lichterfelde Ost, Germany. Application date, October 24, 1925.

Electrodes for use in the electrolysis of alkali metal chloride solutions are made porous by known baking processes, and the electrolyte is introduced into the bath through the pores of the carbon. This is preferably effected by making the anodes hollow, and introducing the electrolyte into the spaces. This partly protects the carbon anodes from attack, and a further improvement is effected by acidifying the electrolyte with dilute hydrochloric acid. In some cases, the acid only may be introduced through the pores of the anode.

254,204. AMINO-OXY COMPOUNDS OF THE AROMATIC SERIES, PROCESS FOR PRODUCING BY ELECTROLYSIS. H. E. Potts, Liverpool. From Chemische Fabrik Grünau Landshoff and Meyer Akt.-Ges., Grünau, near Berlin. Application date, December 29, 1925.

In the electrolytic reduction of aromatic nitro compounds using cathodes of base metal, it has been found advantageous to add the nitro compounds progressively to the catholyte as the reduction proceeds. It has been found unnecessary to use excess of nitro compounds to prevent a secondary reaction in which amines are formed without introduction of a hydroxyl group. It is also preferable to maintain the nitro compound in a highly dispersed condition by adding small amounts of colloidal material. At the same time a high current density may be employed. An example is given of the electrolysis of nitrobenzol with sulphuric acid and a solution of glue, a yield of four parts by weight of para-aminophenol being obtained from seven parts of nitrobenzol.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—228,185 (Victor Chemical Works), relating to production of phosphoric acid, see Vol. XII, p. 338 ; 230,441 (L. F. Pollain), relating to gases from the combustion of sulphur, see Vol. XII, p. 507 ; 231,203 (A. Helfenstein and Helfenstein Elektro-Ofen Ges.), relating to metallurgical furnaces, see Vol. XII, p. 47 (Metallurgical Section) ; 234,826 (F. Krupp Grusonwerk Akt.-Ges.), relating to sulphide ores or metallurgical products, see Vol. XIII, p. 133 ; 235,181 (Norsk Hydro-Elektrisk Kvaelstofaktieselskab), relating to synthetic production of hydrogen cyanide, see Vol. XIII, p. 158 ; 235,867 (Elektrizitätswerk Lonza), relating to production of metaldehyde, see Vol. XIII, p. 202 ; 238,215 (Soc. des Condenseurs Delas), relating to crystallising solid substances from their solutions, see Vol. XIII, p. 380 ; 240,859 (Farbwerke vorm. Meister, Lucius, and Brüning), relating to naphthalene—1 : 4 : 5 : 8—tetracarboxylic acids, see Vol. XIII, p. 606.

International Specifications not yet Accepted

252,152. CARBON. F. Fischer and H. Tropsch, 1, Kaiser-Wilhelm Platz, Mülheim, Ruhr, Germany. International Convention date, May 15, 1925.

Gases containing carbon monoxide are freed from sulphur and are decomposed in the presence of a catalyst such as iron, nickel, or cobalt, or an oxide of these, which is also freed from sulphur, to obtain carbon dioxide and carbon. When the carbon collected contains 5 per cent. of iron, the gases are passed over fresh catalyst. Thus, carbon dioxide is passed over hot coke, and the resulting carbon monoxide freed from sulphur compounds and passed over finely divided iron oxide.

252,182. DYES. I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. (Assignees of Farbenfabriken vorm. F. Bayer and Co., Leverkusen, near Cologne, Germany.) International Convention date, May 12, 1925. Addition to 229,330.

Specification 229,330 (see THE CHEMICAL AGE, Vol. XII, p. 439) describes the production of dyes, which according to the present invention are obtained by coupling a diazotised amine or amino-azo compound, or an intermediate product from a tetrazo compound and one molecule of an azo component, with an alkylamino-naphthol sulphonic acid, and treating the product with an arylsulpho chloride in the presence of an acid-neutralising medium. Thus, *o*-phenetidine is diazotised, coupled with 1-ethyl-amino-8-naphthol-3 : 6-disulphonic acid in alkaline solution, and the product treated with *p*-toluene sulphochloride and sodium carbonate.

252,211. SPLITTING FATS. G. Petroff, 5, Tichwinskaja, Moscow. International Convention date, May 18, 1925.

Fats or oil, *e.g.*, sunflower oil, are split by sulphonic acids of high molecular weight, *e.g.*, naphtha sulphonic acids mixed with sulphuric acid, in the presence of colour absorbents such as animal charcoal.

252,212. SULPHO-FATTY-AROMATIC ACIDS. G. Petroff, 5, Tichwinskaja, Moscow. International Convention date, May 18, 1925.

Sulphuric acid used for sulphonation is washed out of the mixture of non-saturated fatty acids and aromatic hydrocarbons, phenols or turpentine oils, with water and a solution of common salt, or other alkali salts or dilute acetic acid. The residue is dissolved in petroleum, petrol, benzene, toluene, carbon tetrachloride, etc., and the sulpho-fatty-aromatic acids are extracted with aqueous solutions of alcohols or with acetic or formic acid. These acids are employed for splitting fats and oils.

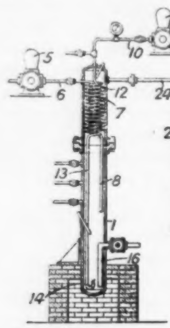
252,308. CRACKING HYDROCARBONS. H. Wolf, 3, Dorotheenstrasse, Bad Homburg vor der Höhe, Germany. International Convention date, May 22, 1925.

Carbon and substances which tend to deposit carbon are taken up by adding to the cracked products of hydrocarbon oils a high-boiling hydrocarbon or other liquid. The lower-boiling vapours are separated by fractional condensation, and the high-boiling hydrocarbons returned to the cracking process, or the whole of the vapours may be condensed in the liquid and then distilled off.

252,327. OXIDISING OILS, ETC. W. B. D. Penniman, Baltimore, U.S.A. International Convention date, May 20, 1925.

To obtain motor fuels, burning oils, aldehydes, fatty acids, alcohols, ketones, solvents, gums, etc., air, which may be enriched with oxygen, is passed through a heated layer of crude petroleum or its distillates, shale oils or tars, waxes, sludges, petroleum residues, asphaltic oils, asphalt, cracked oil residues, wood, peat, lignite, or coal distillates, or oils containing powdered coal, coke, peat, sulphur, etc., in suspension. A catalyst such as aluminium chloride, or oxide of manganese, lead, iron, chromium, vanadium, zinc, copper, or calcium may be added, and the conversion is effected under pressure and at a temperature of 600°-900° C. The reacting materials may be preheated, and the temperature maintained by the heat of reaction. The material to be treated may be suspended in a liquid carrier.

A vertical still 1 is externally heated, and is connected to a condenser 25 and receiver 26, these parts being preferably constructed of copper, chromium, nickel-chrome steel, or monel metal. Oil is supplied by a pump 5, pipe 6, coil 12, and pipe 8, and air by a pump 9, pipe 10, coil 7, and pipe 13. The air is directed upwards by a nozzle 14 or by a perforated pipe. Residual oil is drawn off at 16. A gas oil treated by this process at 500° F. and a pressure of 300 lb. per sq. in., rose in temperature to 725°–750° F., and the distillate separated on standing into an upper water-insoluble layer, an intermediate mixed layer, and a lower aqueous solution of organic substances. Acids, phenols, aldehydes may be removed from the upper layer by agitation with 10 per cent. caustic soda,



252,327

or these may be removed separately by the use of sodium carbonate, caustic soda, and sodium bisulphite. The product is then washed with water, treated with sulphuric acid, and distilled, yielding a motor fuel. The residue is then returned to the still. The acid sludge obtained may be diluted and steam-distilled to obtain alcohols. The upper layer may be first purified by means of fuller's earth, silica gel, or bauxite. The lower layer contains about 3 per cent. of acids, mostly acetic, 7 per cent. of aldehydes, mostly acetaldehyde and propionaldehyde, 3 per cent. of ketones, and 5 per cent. of alcohols. On distillation, acetaldehyde is obtained, and also a liquid which is added to motor fuel to give it anti-knock properties, or may be used as a solvent for shellac, gums, cellulose esters, etc. The distillation residue is treated with sulphuric acid and steam-distilled, to obtain gums, etc.

LATEST NOTIFICATIONS.

255,406. Glycol ethers and cellulose-ester solvents. Carbide and Carbon Chemicals Corporation. July 20, 1925.
255,429. Method of and apparatus for the extraction of crystals from anthracene, naphthalene, and the like distillates of coal-tar. A. Meiro. July 15, 1925.
255,434. Process for the manufacture of colourless products of dialkylbarbituric acids with dimethylaminophenyldimethylpyrazolone. Chemische Fabrik auf Actien (vorm. E. Schering). July 16, 1925.
255,464. Manufacture of hydrofluoric acid. M. Buchner. June 2, 1924.
255,466. Process for the manufacture of new diacylisothiourea-S-alkylethers. Chemische Fabrik auf Actien (vorm. E. Schering). July 16, 1925.
255,474. Process of producing hydroxides and carbonates. M. Buchner. June 14, 1924.

Specifications Accepted with Date of Application

232,591. Metallic alloy. J. Bertram. April 15, 1924.
235,919. Halogenated vat dyestuffs of the anthraquinone series. Chemische Fabrik Griesheim-Elektron. June 20, 1924.
239,169. Refining vegetable or mineral oils. Akt.-Ges. fur Chemiewerte. August 27, 1924.
240,424. Pigments from sulphide ores. S. W. Kendall. September 24, 1924.
240,168. Blue dyestuffs. Farbwerke vorm. Meister, Lucius, and Brüning. September 20, 1924.
241,580. Mixtures yielding salts of sulpho-chloramides. Farbenfabriken vorm. F. Bayer and Co. October 18, 1924.
244,070. Di-substituted thio-ureas of symmetrical structure. Silesia Verein Chemischer Fabriken. December 6, 1924.
244,733. Roasting and sintering fuel-containing ore by the Dwight and Lloyd process. Metallbank und Metallurgische Ges. Akt.-Ges. December 17, 1924.
245,138. Apparatus for burning sulphur. V. G. R. Allienne. December 24, 1924.
245,765. Azo dyestuffs. I. G. Farbenindustrie Akt.-Ges. January 8, 1925.
246,116. Cracking hydrocarbons. Sinclair Refining Co. January 17, 1925.
248,704. Roasting sulphur-containing ores. G. Ross. March 9, 1925.
254,760. Oxygenated organic compounds. J. Y. Johnson. (*Badische Anilin and Soda Fabrik.*) February 2, 1925.
254,762. Reduction of metal and manufacture of alloys. W. Johnson. February 6, 1925.
254,784. Treating petroleum oils. E. C. R. Marks. (*Solar Refining Co.*) April 3, 1925.
254,787. Formamide and hydrocyanic acid or ammonium cyanide. J. Y. Johnson. (*Badische Anilin and Soda Fabrik.*) April 6, 1925.
254,819. Synthesis of organic compounds. J. Y. Johnson. (*Badische Anilin and Soda Fabrik.*) March 9, 1925.
254,888. Artificial resins, Manufacture of. A. Regal. July 29, 1925.
254,939. Solid calcium nitrate. J. Y. Johnson. (*Badische Anilin and Soda Fabrik.*) November 2, 1925.

Applications for Patents

Bader, W., British Celanese, Ltd., and Dreyfus, H. Manufacture of oxygen-containing carbon compounds. 18,149. July 20.
Binz, A., and Räth, C. Production of organic arseno compounds. 18,027. July 19. (Germany, July 22, 1925).
Binz, A., and Räth, C. Production of organic arseno compounds. 18,377. July 22. (Germany, July 22, 1925.)
British Dyestuffs Corporation, Ltd. Friction surfaces, etc. 18,222. July 21.
British Synthetics, Ltd., and Higgins, E. B. Manufacture of chlorides of orthohydroxy-carboxylic acids of polynuclear hydrocarbons. 18,135. July 20.
Calico Printers' Association, Ltd., Lantz, L. A., and Watson, R. Production of aniline black on textile fibres. 18,155. July 20.
Denmann, W. Neutralizing ammonia crystals. 18,247. July 21. (Germany, July 24, 1925.)
Durand and Huguenin Akt.-Ges. Processes for dyeing animal fibres. 18,138. July 20. (Germany, July 20, 1925.)
Gallardo y de Sotto, R. Manufacture of sulphuric acid. 18,150. July 20.
(Gulf Refining Co.). Production of lower-boiling distillates from higher-boiling hydrocarbons. 18,530. July 24.
Hirzel, H. Production of alkyl and aralkyl resorcinols. 18,481. July 24. (Switzerland, July 30, 1925.)
I. G. Farbenindustrie Akt.-Ges. Manufacture of active silica. 18,029. July 19. (Germany, July 23, 1925.)
I. G. Farbenindustrie Akt.-Ges. Production of fast mixed shades on silk. 18,215. July 21. (Germany, December 21, 1925.)
I. G. Farbenindustrie Akt.-Ges. Manufacture of nickel catalyst. 18,327. July 22. (Germany, July 22, 1925.)
I. G. Farbenindustrie Akt.-Ges. Process for refining decamphorated oil of turpentine. 18,446. July 23. (Germany, July 25, 1925.)
Jackson, L. Mellersh-, and Mathieson Alkali Works. Production of chromium compounds. 18,143. July 20.
Johnson, Matthey, and Co., Ltd., and Powell, A. R. Processes for extracting metals. 18,035. July 19. (May 11, 1925.)
Roessler and Hasslacher Chemical Co. Production of amide acid sulphates from nitriles. 18,338. July 22. (United States, July 22, 1925.)
Roessler and Hasslacher Chemical Co. Production of esters from amide acid sulphates. 18,339. July 22. (United States, July 22, 1925.)
Soc. pour l'Exploitation des Procédés E. Urbain. Manufacture of active carbon. 18,232. July 21. (France, July 25, 1925.)

British Patents in the Irish Free State

IN view of the recent decision in a case in an Irish Free State Court that letters patent under the seal of the British Patent Office could not confer privileges in the Irish Free State, the executive council of the Institute of Patentees has considered the position of British patentees in the matter. As the case is *sub judice*, the council has decided to take no immediate action, but has passed the following resolution :—" That in the event of the appeal not being upheld or the Irish Free State Parliament not giving facilities for the rapid passage of the proposed Bill, a deputation wait upon the British Government with a view to urging them to bring pressure to bear upon the Irish Free State Government to legalise the position of British patents in the Free State and furthermore to approach the Irish Free State Government direct on the subject in view of the number of members situated in the Free State who are holders of British patents."

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.
ACID BORIC, COMMERCIAL.—Crystal, £37 per ton, Powder, £39 per ton.
ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.
ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.
BISULPHITE OF LIME.—£7 10s. per ton, packages extra, returnable.
BLEACHING POWDER.—Spot, £9 10s. d/d; Contract, £8 10s. d/d, 4-ton lots.
BORAX, COMMERCIAL.—Crystal, £23 per ton. Powder, £24 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
CALCIUM CHLORATE (SOLID).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carr. paid.
COPPER SULPHATE.—£25 to £25 10s. per ton.
METHYLATED SPIRIT 64 O.P.—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
NICKEL SULPHATE.—£38 per ton d/d.
NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
POTASH CAUSTIC.—£30 to £33 per ton.
POTASSIUM BICHROMATE.—4½d. per lb.
POTASSIUM CHLORATE.—3¼d. per lb., ex wharf, London, in cwt. kegs.
SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.
SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.
SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.
SODA CRYSTALS.—£5 to £5 5s. per ton ex railway depots or ports.
SODIUM ACETATE 97/98%.—£21 per ton.
SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.
SODIUM BICHROMATE.—3½d. per lb.
SODIUM BISULPHITE POWDER 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.
SODIUM CHLORATE.—3d. per lb.
SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.
SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.
SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.
SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.
SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.
SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—4¾d. to 5d. per lb. Crude 60's, 1s. 5d to 1s. 6d.
ACID CRESYLIC 97/99.—2s. to 2s. 1d. per gall. Pale, 95%. 1s. 10d. to 2s. per gall. Dark, 1s. 9d. to 1s. 10d. per gall. Steady.
ANTHRACENE.—A quality, 2½d. to 3d. per unit.
ANTHRACENE OIL, STRAINED.—8d. to 8½d. per gall. Unstrained, 7½d. to 8d. per gall.
BENZOL.—Crude 65's, 1s. 4d. to 1s. 5d. per gall., ex works in tank wagons. Standard Motor, 2s. to 2s. 3d. per gall., ex works in tank wagons. Pure, 2s. 3d. to 2s. 9d. per gall., ex works in tank wagons.
TOLUOL.—90%, 2s. to 2s. 3d. per gall. Pure, 2s. 3d. to 2s. 9d. per gall.
XYLOL.—2s. 4d. to 2s. 9d. per gall. Pure, 3s. 3d. per gall.
CREOSOTE.—Cresylic, 20/24%, 10d. per gall. Standard specification, middle oil, 6½d. to 7½d. per gall. Heavy, 7½d. to 8½d. per gall.
NAPHTHA.—Crude, 10d. to 1s. 1d. per gall. according to quality. Solvent 90/160, 2s. to 2s. 3d. per gall. Solvent 90/190, 1s. 3½d. to 1s. 6d. per gall.
NAPHTHALENE CRUDE.—Drained Creosote Salts, £3 10s. to £5 per ton. Whizzed or hot pressed, £5 10s. to £7 10s.
NAPHTHALENE.—Crystals and Flaked, £11 10s. to £13 per ton, according to districts.
PITCH.—Medium soft, 82s. 6d. to 89s. per ton.
PYRIDINE.—90/140, 17s. to 20s. per gall. Heavy, 7s. to 10s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.
ACID ANTHRANILIC.—6s. 6d. per lb. 100%.
ACID BENZOIC.—1s. 9d. per lb.
ACID GAMMA.—8s. per lb.
ACID H.—3s. 3d. per lb. 100% basis d/d.
ACID NAPHTHIONIC.—2s. 2d. per lb. 100% basis d/d.
ACID NEVILLE AND WINTHER.—4s. 9d. per lb. 100% basis d/d.
ACID SULPHANILIC.—9d. per lb. 100% basis d/d.
ANILINE OIL.—7d. per lb. naked at works.
ANILINE SALTS.—7d. to 7½d. per lb. naked at works.
BENZALDEHYDE.—2s. 1d. per lb.
BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.
o-CRESOL 29/31° C.—3d. to 3½d. per lb.
m-CRESOL 98/100%.—2s. 1d. to 2s. 3d. per lb.
p-CRESOL 32/34° C.—2s. 1d. to 2s. 3d. per lb.
DICHLORANILINE.—2s. 3d. per lb.
DIMETHYLANILINE.—1s. 11d. to 2s. per lb. d/d. Drums extra.
DINITROBENZENE.—9d. per lb. naked at works.
DINITROCHLORBENZENE.—£84 per ton d/d.
DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.
DIPHENYLANILINE.—2s. 10d. per lb. d/d.
a-NAPHTHOL.—2s. per lb. d/d.
B-NAPHTHOL.—11d. to 1s. per lb. d/d.
a-NAPHTHYLAMINE.—1s. 3d. per lb. d/d.
B.NAPHTHYLAMINE.—3s. 2d. per lb. d/d.
o-NITRANILINE.—5s. 9d. per lb.
m-NITRANILINE.—3s. 3d. per lb. d/d.
p-NITRANILINE.—1s. 9d. per lb. d/d.
NITROBENZENE.—5d. per lb. naked at works.
NITRONAPHTHALENE.—10d. per lb. d/d.
R. SALT.—2s. 4d. per lb. 100% basis d/d.
SODIUM NAPHTHIONATE.—1s. 9d. per lb. 100% basis d/d.
o-TOLUIDINE.—8d. per lb. naked at works.
p-TOLUIDINE.—2s. 2d. per lb. naked at works.
m-XYLIDINE ACETATE.—2s. 11d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8. Grey, £17 10s. per ton. Liquor, 9d. per gall. 32° Tw.
CHARCOAL.—£7 to £9 per ton, according to grade and locality.
IRON LIQUOR.—1s. 6d. per gall. 32° Tw. 1s. 2d. per gall., 24° Tw.
RED LIQUOR.—9½d. to 1s. per gall.
WOOD CREOSOTE.—2s. 9d. per gall. Unrefined.
WOOD NAPHTHA, MISCIBLE.—3s. 6d. per gall. 60% O.P. Solvent, 3s. 6d. per gall. 40% O.P.
WOOD TAR.—£3 to £5 per ton, according to grade.
BROWN SUGAR OF LEAD.—£39 to £40 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 5d. per lb., according to quality, Crimson, 1s. 3d. to 1s. 7½d. per lb., according to quality
ARSENIC SULPHIDE, YELLOW.—2s. per lb.
BARYTES.—£3 10s. to £6 15s. per ton, according to quality.
CADMIUM SULPHIDE.—2s. 9d. per lb.
CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.
CARBON BLACK.—5½d. per lb., ex wharf.
CARBON TETRACHLORIDE.—£46 to £55 per ton, according to quantity, drums extra.
CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—3s. 9d. per lb.
INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5½d. to 6½d. per lb.
LAMP BLACK.—£35 per ton, barrels free.
LEAD HYPOSULPHITE.—9d. per lb.
LITHOPONE, 30%.—£22 10s. per ton.
MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton f.o.r. London.
SULPHUR.—£9 to £11 per ton, according to quality.
SULPHUR CHLORIDE.—4d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.
THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb. carriage paid.
THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.
VERMILION, PALE OR DEEP.—5s. 3d. per lb.
ZINC SULPHIDE.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, 80% B.P.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 4d. to 2s. 6d. per lb. Brisk demand.

ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., according to quantity.

ACID, BORIC B.P.—Crystal, £43 per ton; Powder, £47 per ton. Carriage paid any station in Great Britain, in ton lots.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 4d. to 1s. 4½d. per lb., less 5%.

ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.

ACID, PYROGALLIC, CRYSTALS.—6s. 7d. per lb. Resublimed, 7s. 3d.

ACID, SALICYLIC.—1s. 4d. to 1s. 5½d. per lb. Technical.—10½d. to 11d. per lb.

ACID, TANNIC B.P.—2s. 10d. per lb.

ACID, TARTARIC.—1s. 0½d. per lb., less 5%. Market firm.

AMIDOL.—8s. 6d. per lb., d/d.

ACETANILIDE.—1s. 7d. to 1s. 8d. per lb. for quantities.

AMIDOPYRIN.—12s. 6d. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity.

AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.

ATROPINE SULPHATE.—11s. per oz. for English make.

BARBITONE.—9s. per lb.

BENZONAPHTHOL.—3s. 3d. per lb. spot.

BISMUTH CARBONATE.—12s. 6d. to 14s. 3d. per lb.

BISMUTH CITRATE.—9s. 6d. to 11s. 3d. per lb.

BISMUTH SALICYLATE.—10s. 3d. to 12s. per lb.

BISMUTH SUBNITRATE.—10s. 9d. to 12s. 6d. per lb. according to quantity.

BORAX B.P.—Crystal, £27; Powder, £28 per ton. Carriage paid any station in Great Britain, in ton lots.

BROMIDES.—Potassium, 1s. 9d. to 1s. 11d. per lb.; sodium, 1s. 11d. to 2s. 2d. per lb.; ammonium, 2s. 2d. to 2s. 5d. per lb., all spot.

CALCIUM LACTATE.—1s. 4d. to 1s. 6d.

CHLORAL HYDRATE.—3s. 3d. to 3s. 6d. per lb., duty paid.

CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

FORMALDEHYDE.—£40 per ton, in barrels ex wharf.

GUAIACOL CARBONATE.—7s. 6d. per lb.

HEXAMINE.—2s. 4d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 8d. per gallon f.o.r. makers' works, naked.

HYDROQUINONE.—4s. 3d. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.

IRON AMMONIUM CITRATE B.P.—2s. to 2s. 3d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 2s. 1d. to 2s. 4d. per lb.

IRON PERCHLORIDE.—20s. to 22s., according to quantity.

MAGNESIUM CARBONATE.—Light Commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light Commercial, £67 10s. per ton, less 2½%, price reduced; Heavy Commercial, £22 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.

MENTHOL.—A.B.R. recrystallised B.P., 19s. 9d. net per lb., Synthetic, 10s. 6d. to 12s. 6d. per lb., according to quality.

MERCURIALS.—Red oxide, 5s. 11d. to 6s. 1d. per lb.; Corrosive sublimate, 4s. 3d. to 4s. 5d. per lb.; white precipitate, 4s. 9d. to 4s. 11d. per lb.; Calomel, 4s. 6d. to 4s. 8d. per lb.

METHYL SALICYLATE.—1s. 7d. per lb.

METHYL SULPHONAL.—16s. 6d. per lb.

METOL.—10s. per lb. British make.

PARAFORMALDEHYDE.—1s. 9d. for 100% powder.

PARALDEHYDE.—1s. 4d. per lb. (1s. 2d. in carboys.)

PHENACETIN.—4s. per lb.

PHENAZONE.—6s. per lb.

PHENOLPHTHALEIN.—4s. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—80s. per cwt., less 2½% for ton lots.

POTASSIUM CITRATE.—1s. 11d. to 2s. 1d. per lb.

POTASSIUM FERRICYANIDE.—1s. 9d. per lb. in cwt. lots. Quiet.

POTASSIUM IODIDE.—16s. 8d. to 17s 2d. per lb., according to quantity.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included, f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 6½d. per lb., spot.

QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., in 100 oz. tins.

RESORCIN.—4s. to 5s. per lb., spot.

SACCHARIN.—55s. per lb.

SALOL.—3s. per lb.

SODIUM BENZOATE, B.P.—1s. 10d. to 2s. 2d. per lb.

SODIUM CITRATE, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb., B.P.C., 1923. 1s. 11d. to 2s. 2d. per lb., according to quantity.

SODIUM FERROCYANIDE.—4d. per lb. carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 5s. per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—75s. to 80s. per cwt., according to quantity.

SODIUM SALICYLATE.—Powder, 1s. 9d. to 1s. 10d. per lb. Crystal, 1s. 10d. to 1s. 11d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.

SODIUM SULPHITE, ANHYDROUS, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.

SULPHONAL.—11s. per lb.

TARTAR EMETIC, B.P.—Crystal or Powder, 1s. 10d. to 1s. 11d. per lb.

THYMOL.—12s. to 13s. 9d. per lb.

Perfumery Chemicals

ACETOPHENONE.—10s. per lb.

AUBEPINE (EX ANETHOL).—10s. per lb.

AMYL ACETATE.—3s. per lb.

AMYL BUTYRATE.—5s. 6d. per lb.

AMYL SALICYLATE.—3s. 3d. per lb.

ANETHOL (M.P. 21/22° C.).—5s. 9d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. 3d. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. 3d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL BENZOATE.—2s. 9d. per lb.

CINNAMIC ALDEHYDE NATURAL.—17s. 9d. per lb.

COUMARIN.—11s. 9d. per lb.

CITRONELLOL.—15s. per lb.

CITRAL.—10s. per lb.

ETHYL CINNAMATE.—10s. per lb.

ETHYL PHTHALATE.—3s. per lb.

EUGENOL.—10s. per lb.

GERANIOL (PALMAROSA).—20s. per lb.

GERANIOL.—6s. 3d. to 11s. 6d. per lb.

HELIOTROPINE.—5s. per lb.

ISO EUGENOL.—14s. per lb.

LINALOL.—14s. to 17s. 6d. per lb.

LINALYL ACETATE.—17s. to 20s. per lb.

METHYL ANTHRANILATE.—9s. 3d. per lb.

METHYL BENZOATE.—5s. per lb.

MUSK KETONE.—34s. 6d. per lb.

MUSK XYLOL.—8s. per lb.

NEROLIN.—3s. 9d. per lb.

PHENYL ETHYL ACETATE.—12s. per lb.

PHENYL ETHYL ALCOHOL.—9s. 6d. per lb.

RHODINOL.—27s. 6d. per lb.

SAFROL.—1s. 6d. per lb.

TERPINEOL.—1s. 6d. per lb.

VANILLIN.—21s. 9d. per lb.

Essential Oils

ALMOND OIL.—11s. 6d. per lb.

ANISE OIL.—3s. per lb.

BERGAMOT OIL.—27s. per lb.

BOURBON GERANIUM OIL.—12s. per lb.

CAMPHOR OIL.—67s. 6d. per cwt

CANANGA OIL, JAVA.—20s. per lb.

CINNAMON OIL, LEAF.—6d. per oz.

CASSIA OIL, 80/85%.—8s. 9d. per lb.

CITRONELLA OIL.—Java, 85/90%, 2s. 8d. Ceylon, 2s. per lb.

CLOVE OIL.—7s. per lb.

EUCALYPTUS OIL, 70/75%.—2s. per lb.

LAVENDER OIL.—French 38/40%, Esters, 15s. 6d. per lb.

LEMON OIL.—7s. 9d. per lb.

LEMONGRASS OIL.—4s. 6d. per lb.

ORANGE OIL, SWEET.—10s. 9d. per lb.

OTTO OF ROSE OIL.—Bulgarian, 65s. per oz. Anatolian, 30s. per oz.

PALMA ROSA OIL.—9s. 9d. per lb.

PEPPERMINT OIL.—Wayne County, 67s. 6d. per lb. Japanese, 11s. 6d. per lb.

PETITGRAIN OIL.—9s. per lb.

SANDAL WOOD OIL.—Mysore, 26s. per lb. Australian, 17s. 3d. per lb

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, July 28, 1926.

BUSINESS has been fairly active during the past week and is without special feature. Things are, of course, slowing down as we go to press, owing to the imminence of the holiday. Export demand is quiet.

General Chemicals

ACETONE is lower in price and is quoted at about £76 10s. per ton, with special prices for quantities.
ACID ACETIC is in better demand, price for technical 80% is unchanged, but the pure 80 has been advanced by £1 per ton.
ACID FORMIC is inactive, prices are very firm.
ACID LACTIC.—Unchanged at £43 per ton for 50% by weight.
ACID OXALIC is quietly steady at 3⅜d. per lb.
ACID TARTARIC is quiet at 11⅝d. per lb.
ALUMINA SULPHATE.—Unchanged at £5 10s. to £5 15s. per ton for 17–18%.
AMMONIUM CHLORIDE.—The tendency remains in buyers' favour, price nominally £18 per ton.
ARSENIC.—The market remains lifeless, price ranging from £15 to £17 per ton, according to make and position.
BARIUM CHLORIDE is firm at £10 per ton.
EPSOM SALTS.—Unchanged.
FORMALDEHYDE.—The better demand is being maintained at £40 to £42 per ton.
IRON SULPHATE.—Unchanged.
LEAD ACETATE has advanced in price and is quoted at £46 10s. for white and £43 per ton for brown.
METHYL ALCOHOL.—Unchanged.
METHYL ACETONE.—The advance in price is maintained, price £55 per ton.
POTASSIUM CAUSTIC AND CARBONATE.—Unchanged.
POTASSIUM CHLORATE is firm at 3⅝d. per lb.
POTASSIUM PERMANGANATE.—Demand is very small, price 7d. per lb. for B.P. grade.
POTASSIUM PRUSSIATE is firm at 7d. per lb.
SODA ACETATE remains scarce although the forward tendency is rather easier at about £21 per ton.
SODA BICHROMATE is an active market, home makers' prices being unaltered.
SODA NITRITE is quiet, price £20 10s. per ton.
SODA PHOSPHATE.—Unchanged.
SODA PRUSSIATE is quiet, but price is firm at 3¾d. per lb.
SODA SULPHIDE.—Unchanged.
ZINC SULPHATE.—Unchanged.

Latest Oil Prices

LONDON.—LINSEED OIL steady and unaltered. Spot, £36 5s., ex-mill; July, £35; August, £35 2s. 6d.; September-December, £35 5s.; January-April, £35 12s. 6d. RAPE OIL quiet. Crude, extracted, spot, £49; technical refined, £51. COTTON OIL steady. Refined common edible, £46; Egyptian, crude, £40 10s.; deodorised, £48. TURPENTINE firm and 1s. 6d. per cwt. higher. American, spot, 64s.; and July-December, 65s.

HULL.—LINSEED OIL.—Spot, to September-December, £35 7s. 5d.; January-April, £35 15s. COTTON OIL.—Bombay crude, £37; Egyptian crude, £41 10s.; edible refined, £45; technical, £41. PALM KERNEL OIL.—Crushed naked, 5½ per cent., £42 10s. GROUNDNUT OIL.—Crushed-extracted, £47; deodorised, £51. SOYA OIL.—Extracted and crushed, £38; deodorised, £41 10s. RAPE OIL.—Crushed-extracted, £48; refined, £50 per ton, net cash terms, ex mill. CASTOR OIL and COD OIL.—Unaltered.

Nitrogen Products

Export.—The continuance of the coal stoppage and the absence of any signs of early settlement are no doubt responsible for the lethargy of the sulphate market. Buyers of large quantities tend to hold off in anticipation of resumption of work at the collieries and larger supplies. As producers have only small quantities available for prompt shipment, and as they are not eager to make commitments for forward, the lifelessness of the market seems likely to continue. Continental producers have made large sales up to about April, but no fresh sales have been reported recently. British producers are quoting on the basis of £10 15s. per ton, f.o.b. U.K. port, in single bags for 100-ton lots.

Home.—As producers seem unwilling to commit themselves to a fresh home price scale, and as they continue selling for prompt at the March-May prices, the transactions are very small. It is hoped that for August delivery a new price will be announced. The usual drop for summer delivery seems certain to take place; the extent of the drop is a matter of conjecture only.

Nitrate of Soda.—Nitrate prices remain at the scale figure of 18s. 4d. per metric quintal, f.a.s. Chile; but transactions have been very small. As nitrate stocks are heavy in Chile, as well as in Egypt and on the continent, there seems little incentive for buyers to purchase quantities which will not be required until late autumn at the earliest. It appears unlikely that anything will come of the negotiations between the Association and the Chilian Government during the present season.

Calcium Cyanamide

No announcement has yet been made concerning the new season's prices for delivery in Great Britain. As indicated in our last issue, however, it is anticipated that somewhat lower prices may prevail this year than was the case during the past season. The present price of calcium cyanamide, delivered in four-ton lots to any railway station, is £10 6s. per ton.

Decreased Production of U.S. Bauxite

THE production of bauxite in the United States in 1925 was 316,540 long tons, valued at $1,988,250, a decrease of 9 per cent. in quantity and 7 per cent. in value as compared with the domestic production of 347,570 long tons in 1924, according to the U.S. Bureau of Mines. Imports in 1925 amounted to 353,696 long tons, while exports, largely bauxite concentrates, were 78,570 long tons. In 1924 imports were 201,974 long tons and exports 77,065 long tons. The following is a statement of domestic bauxite sold by producers to industries in 1924 and 1925, in long tons:

Year.	Aluminium.	Chemicals.	Abrasive, refractories, and cement.	Total.
1924	225,780	54,870	66,920	347,570
1925	173,040	67,420	73,980	314,440

The imports of bauxite in 1925 increased about 75 per cent., as compared with 1924, and came chiefly from British and Dutch Guiana, South America, though some French and Dalmatian bauxite was received.

Heat Treatment of Cast Iron

THE behaviour of cast iron, as used in large gas and other internal-combustion engine parts, is of prime importance for practical working. Thus the temperature to which certain parts, such as piston heads, are subjected varies considerably and often reaches 600° C. Tests (says the *Giesserei Zeitung*) were undertaken to establish the effect of low-temperature heat-treatment on the properties of cast iron and led to the conclusion that it leads to dissociation of carbide with consequent drop in strength and hardness. The amount of such dissociation varies with the temperature and rises with same. If the manganese-content of the iron be increased, a more stable carbide-formation ensues, with less tendency to dissociation through heat-treatment, and this is intensified by the addition of a small quantity of chromium. On the other hand, a slight addition of nickel reduces the stability of the carbide and causes rapid dissociation during heat-treatment.

Baden Potash Deposits

WORKS have been instituted at the new potash deposits found in Baden recently. Two shafts are being used, for working one square kilometre, although the deposits cover an area about eight to ten kilometres in length, four kilometres in width, and from four to five metres in depth. A yield of 1,600,000 tons of pure potash is expected from the area now being worked. It is hoped in Germany that this potash will counteract the influence of the Alsatian material, as all conditions are favourable and methods of working up-to-date.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, July 28, 1926.

BUSINESS of any importance in the Heavy Chemical market is practically at a standstill owing to the continuance of the coal stoppage, and the holidays which have just finished. Nevertheless, prices remain fairly steady and there is no change of any importance to note since our last report.

Industrial Chemicals

ACID ACETIC, 98/100%.—£55 to £67 per ton, according to quantity and packing, c.i.f. U.K. port; 80% pure, £39 to £41 per ton; 80% technical, £38 to £39 per ton.

ACID BORIC.—Crystal, granulated or small flakes, £37 per ton; powdered, £39 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—In moderate demand and quoted price unchanged at 4⅞d. per lb., delivered or f.o.b. U.K. port.

ACID CITRIC, B.P. CRYSTALS.—Usual steady demand and price unchanged at about 1s. 3½d. per lb., less 5%, ex store. Offered for prompt shipment at 1s. 3⅜d. per lb., less 5%, ex wharf.

ACID FORMIC, 85%.—Spot material quoted £52 per ton, ex store. Rather cheaper offers from the continent now quoted £49 10s. per ton, c.i.f. U.K. ports.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80%.—Usual steady demand and prices unchanged at £23 5s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Remains unchanged at about 3½d. per lb., ex store. Offered for early delivery from the continent at 3⅜d. per lb., ex wharf.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—In good demand and price for spot material advanced to about 11⅞d. per lb., less 5% ex store. Quoted for early delivery at 11⅝d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE, 17/18%, IRON FREE.—On offer from the continent at about £5 8s. 6d. per ton, c.i.f. U.K. ports. Spot material quoted £6 5s. per ton, ex store.

ALUM LUMP POTASH.—Spot material unchanged at about £9 5s. per ton, ex store. Quoted £8 per ton, c.i.f. U.K. ports, prompt shipment. Crystal powder on offer at about £7 15s. per ton, c.i.f. U.K. port. Spot material available at £8 7s. 6d. per ton, ex store.

AMMONIA ANHYDROUS.—Imported material selling at about 11¼d. to 11½d. per lb., ex wharf, containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered or f.o.b. U.K. ports.

AMMONIA LIQUID, 88°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £23 10s. to £25 10s. per ton, ex station. Continental on offer at about £21 10s. per ton, c.i.f. U.K. ports. Fine white crystals of continental manufacture quoted £18 5s. per ton, c.i.f. U.K. port.

ARSENIC, WHITE POWDERED.—Unchanged at about £15 15s. per ton, ex wharf, early delivery. Spot material on offer at £16 10s. per ton, ex store.

BARIUM CARBONATE, 98/100%.—White powdered quality quoted £6 15s. per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE.—Quoted £9 2s. 6d. per ton, c.i.f. U.K. ports. Spot material now available at about £10 5s. per ton, ex store.

BLEACHING POWDER.—English material unchanged at £9 10s. per ton, ex station, contracts 20s. per ton less. Continental now quoted £7 15s. per ton c.i.f. U.K. ports.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £22 10s. per ton; crystals, £23 per ton; powdered £24 per ton, carriage paid U.K. stations.

CALCIUM CHLORIDE.—English manufacturer's price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, ex station. Continental quoted £3 15s. per ton, c.i.f. U.K. port.

COPPERAS, GREEN.—Quoted £3 10s. per ton, f.o.r. works. Moderate inquiry for export and price about £4 2s. 6d. per ton, f.o.b. U.K. port.

COPPER SULPHATE, 99/100%.—Continental material on offer at about £22 10s. per ton, ex wharf. English material for export quoted £23 5s. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Rather higher quotations. Now quoted £39 per ton, c.i.f. U.K. ports. Spot material still available at £40 per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £3 per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material quoted £38 per ton, ex store.

LEAD, WHITE.—On offer at £39 per ton, ex store.

LEAD, ACETATE.—White crystals quoted £45 per ton, c.i.f. U.K. ports, prompt shipment. Brown about £40 10s. per ton, c.i.f. U.K. ports.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store, in moderate demand.

POTASH CAUSTIC, 88/92%.—Syndicate prices vary from £25 10s. to £28 15s. per ton, c.i.f. U.K. ports according to quantity and destination. Spot material available at about £29 per ton.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE, 96/98%.—Quoted £25 5s. per ton, ex wharf, early delivery. Spot material on offer at £26 10s. per ton, ex store. 90/94% quality quoted £22 5s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 98/100%.—Powdered on offer at £26 15s. per ton, c.i.f. U.K. ports. Crystals, £28 per ton, c.i.f. U.K. ports.

POTASSIUM NITRATE (SALTPETRE).—Unchanged at about £22 5s. per ton, c.i.f. U.K. ports, spot material available at £24 per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 7½d. per lb., ex store, spot delivery. To come forward 7d. per lb., ex wharf.

POTASSIUM PRUSSIATE, YELLOW.—Now quoted 7d. per lb., ex wharf, spot delivery. Also to come forward.

SODA CAUSTIC.—76/77%, £17 10s. per ton. 70/72%, £16 2s. 6d. per ton. Broken 60%, £16 12s. 6d. per ton. Powdered 98/99%, £20 17s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—English material quoted £22 per ton, ex station. Continental on offer at about £20 10s. per ton, ex store, or to come forward £19 15s. per ton, c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—English price unchanged at 3½d. per lb. delivered.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, £1 7s. 6d. per ton more. (Alkali) 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE OF SODA.—Large crystals of English manufacture quoted £9 per ton, ex station, minimum 4 ton lots. Pea crystal, £14 10s. per ton, ex station. Continental commercial on offer at about £7 15s. per ton, c.i.f. U.K. ports.

SODIUM NITRATE.—Quoted £13 per ton, ex store. 96/98% refined quality, 7s. 6d. per ton extra.

SODIUM NITRITE, 100%.—Quoted £24 per ton, ex store. Offered from the continent at about £22 5s. per ton, c.i.f. U.K. ports.

SODIUM PRUSSIATE, YELLOW.—Offered for early delivery at 4d. per lb., ex wharf. Spot material quoted 4¼d. per lb., ex store.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption, £3 10s. per ton, ex works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE, 60/62%.—Solid, £13 5s. per ton; broken, £14 5s. per ton; flake, £15 5s. per ton. Crystals, 31/34%, £8 12s. 6d. per ton. All delivered buyers' works U.K., minimum 5 ton lots with slight reduction for contracts. 60/62%, solid quality offered from the continent at about £9 15s. per ton c.i.f. U.K. ports; broken, 15s. per ton more. Crystals, 30/32%, £7 per ton, c.i.f. U.K. port.

SULPHUR.—Flowers, £11 10s. per ton; roll, £10 5s. per ton; rock, £10 5s. per ton; floriestella, £9 15s. per ton; ground American, £9 per ton, ex store, spot delivery. Prices nominal.

ZINC CHLORIDE.—British material, 96/98%, quoted £23 15s. per ton, f.o.b. U.K. ports. 98/100%, solid, on offer from the continent at about £21 15s. per ton, c.i.f. U.K. ports; powdered, 20s. per ton extra.

ZINC SULPHATE.—Continental make on offer at about £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates

BETA NAPHTHOL.—11d. to 1s. per lb. Some inquiries.

PARANITRANILINE.—1s. 9d. per lb. Some inquiries.

BENZIDINE BASE.—3s. 3d. per lb. Some inquiries.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, July 29, 1926.

There has not been much fluctuation in prices of chemicals on the Manchester market this week, and whilst some articles are displaying a certain amount of easiness, it is not particularly marked and is counterbalanced to some extent by added firmness in one or two other instances. Buying for home trade consumption continues on a somewhat restricted scale and sellers are looking for no improvement whilst the coal shortage exists to hamper industrial operations as it is doing. Export business also is still on quiet lines and overseas buyers show no disposition to operate with any degree of freedom.

Heavy Chemicals

For sulphide of sodium the demand is slow, as it has been for some time now, and values are easy, with concentrated quoted at £10 10s. per ton and commercial quality at about £8 15s. Bleaching powder is unchanged at £8 10s. per ton, but inquiry for this continues rather slow. Phosphate of soda is being offered at about £12 10s. per ton, without attracting very much attention from buyers. Nitrite of soda is quiet with quotations barely steady at round £20 per ton. Acetate of soda seems to be little changed from last week, values being pretty well held at about £21 10s. per ton. Caustic soda is firm and meets with a moderate inquiry, prices ranging from £15 2s. 6d. per ton for 60 per cent. to £17 10s. for 76 per cent. material. Prussiate of soda continues to sell rather slowly, but prices are fairly steady at about 3⅞d. per lb. Alkali is firm and in fair request at £6 15s. per ton. Bichromate of soda is steady and in quiet demand at 3¼d. per lb. Chlorate of soda continues to sell only in small quantities and values are perhaps a shade easier at 3⅛d. to 3¼d. per lb. Saltcake keeps dull, but quotations are unchanged at round £3 5s. per ton, whilst glauber salts are also quiet at about £3 15s. per ton. Hyposulphite of soda continues steady at £15 5s. per ton for photographic quality and £9 15s. for commercial, demand being fair.

Chlorate of potash is in small request and is now quoted at from 3⅜d. to 3⅞d. per lb. Caustic soda shows little change at about £27 per ton, and the demand is fair. Carbonate of potash, 90 per cent. material, is on offer at £25 15s. to £26 per ton. Permanganate of potash meets with some inquiry at steady prices with commercial quality still quoted at 5d. to 5¼d. per lb. and B.P. material at about 7d. Yellow prussiate of potash is quiet and easy at 6⅝d. per lb.

Arsenic seems to be slightly steadier at round £13 10s. on rails, for white powdered, Cornish makes, but the demand for this keeps within comparatively narrow limits. Sulphate of copper is quiet on export account at £23 to £23 5s. per ton, f.o.b. Supplies of acetate of lime are on the short side and values have again advanced to about £17 per ton for grey material, with brown offered at round £8. Acetate of lead also displays firmness although there is not much call for it at the moment; white is quoted at up to £46 per ton and brown at £41. Nitrate of lead remains steady at £40 to £41 per ton.

Acids and Tar Products

Oxalic acid is easy and the demand is quiet, the present range of values being 3¼d. to 3⅜d. per lb. Acetic acid appears to be well held at £37 to £38 per ton for 80 per cent. commercial and about £67 for glacial. Tartaric acid is fully maintained at 11⅜d. per lb., and a fair amount of inquiry has been reported. Citric acid keeps steady and in quiet demand at about 1s. 3½d. per lb.

Among the coal-tar by-products, most of which remain purely nominal on scarcity, pitch is still quoted for forward delivery at about 85s. per ton, f.o.b. Solvent naphtha is said to be round 1s. 10d. per gallon, and creosote oil at up to 7d. Crystal carbolic acid is nominal at about 5d. per lb., and aniline oil and salt at 8d. to 9d. per lb. In no case, however, is much business possible just now.

The *Textile World* (New York) publishes a full description of new Skenandoa Rayon plant shortly to begin operations at Utica, N.Y. Production will be on the basis of the viscose process as modified and developed by Dr. Emile Bronnert of Strasbourg, who is a member of the directorate and will be the chief technical adviser to the company. The capacity of the initial unit will be 2,500 lb. daily.

British Oxygen Co. General Meeting

Effect of Industrial Troubles

The general meeting of the British Oxygen Co., Ltd., was held on Friday, July 23, in London.

Mr. K. S. Murray (chairman of the company) presided, and before moving the adoption of the report and accounts, referred to the serious effect which the prolonged depression in the staple engineering trades had upon the company's business. The directors felt, in view of all the perplexities of the situation, that they would have the support of shareholders in adopting a cautious policy in the matter of the company's liquid resources. The net profit for the financial year amounted to £88,105, as compared with £137,090 for the previous year. The profit for the year would have been sufficient to enable the same dividend as last year to be paid, but in view of the uncertain outlook and the importance of conserving cash resources, the directors recommended a dividend of 8 per cent., leaving a balance of £28,105 to be added to the existing balance, making a total of £172,374 to be carried forward to the next year's account.

Apart from the disappointing results due to the prevailing depression, said the chairman, it was a saving grace about their business that new outlets for oxygen and their other products were always turning up, and had done so to a marked extent during the year. Although these did not compensate for the present restricted demand for oxygen amongst large consumers they represented potential developments which would become of increasing value as time went on.

Arrangement with a Competitor

Dealing with the subject of competition, the chairman said they had recently made a friendly arrangement with a company which, financially and in other respects, had been their strongest and most influential competitor for several years, the arrangement being on the basis of that company transferring its customers to them and closing down its factories. The result of this was that, in certain districts, an appreciable amount of additional business would be acquired, and the increased output would enable the existing competitive prices to be maintained at a more satisfactory profit to the company. He finally referred to the improvement which the company had introduced in the construction of oxygen plants. This improvement was now being adopted not only on new plants, for which a considerable number of orders were now being executed at Edmonton, but was also gradually being carried out in the large plants at all their factories. This improvement increased the efficiency of the oxygen apparatus, and enabled a very high purity of oxygen to be obtained, a matter of increasing importance to all branches of the engineering industry.

The report and statement of accounts were adopted. A final dividend of 4½ per cent., less tax, making, with the interim dividend, 8 per cent. for the year, was declared. The retiring directors were re-elected.

Fourth American Colloid Symposium

Two hundred colloid chemists were present at the Massachusetts Institute of Technology, June 23 to 25, on the occasion of the Fourth National Colloid Symposium. Professor J. W. McBain, of the University of Bristol, read the principal paper, "A Survey of the Main Principles of Colloid Science." Other papers read included: "The Colloid Particles as Revealed by Catalytic Studies," by H. S. Taylor; "The Mechanism of Adsorption and the Swelling of Gels," by Dr. C. Terzaghi; "Studies in Gelatin," by E. O. Kraemer; "Mass Action Effects in the Interaction of Gelatin and Acid," by W. K. Lewis and C. F. Daniell; "Specific Ion Effects in the Behaviour towards Tanning Agents of Collagen Treated with Neutral Salts," by K. H. Gustavson; "The Making and Breaking of Emulsions," by Dr. W. P. Davey; "Emulsification: A Study of Oil Soluble Emulsifying Agents," by Brian Mead; "X-Rays and Colloids," by G. L. Clark; "The Structure of Ramie Cellulose as Derived from X-Ray Data," by W. H. Dore and O. L. Sponsler; and "The Place of Adhesion in the Glueing of Wood," by F. L. Browne and P. R. Truax. Arrangements are already being made for the next colloid symposium, to be held at Ann Arbor in June, 1927.

Company News

INTERNATIONAL PAINT AND COMPOSITIONS.—The directors have declared the usual interim dividend of 3 per cent., less income tax, on the preference shares, and 3 per cent. interim dividend, less tax, on the ordinary shares.

ENGLISH CHINA CLAYS, LTD.—The directors announce the payment on August 2 of a dividend on the preference shares at the rate of 7 per cent. per annum for the half-year ended June 30 last, to all preference shareholders registered on July 24.

RHODESIAN BROKEN HILL DEVELOPMENT CO.—After writing off £48,256 for depreciation the accounts for 1925 show a loss of £104,076. From this is deducted a profit of £30,032 on shares realised, and the credit balance of £14,918 brought forward leaving a debit balance of £59,126 to be carried forward.

ALUMINIUM CORPORATION.—The report of the directors for the year ended December 31 last states that the profit for the twelve months amounts to £53,743, and after taking in £23,990 brought forward and providing for the debenture loan and mortgage interest, there is a debit balance of £13,734 to be carried forward to next year.

FORSTER'S GLASS CO.—A credit balance of £29,432 is shown for the year ended March 31 last, which, with £6,635 brought in, makes available £36,067. A sum of £5,000 has been written off plant and machinery, £5,000 off patents and £6,000 off tools, while £10,000 is transferred to reserve and £9,567 is carried forward. The preference dividend is in arrear from October 1, 1921.

LOW TEMPERATURE CARBONISATION, LTD.—In connection with an announcement made earlier in the year that fresh capital would be raised by the issue of £150,000 8 per cent. prior lien debenture stock, the Secretary, in a circular, states that the stock will be offered for sale within the next few days at par, payable 12½ per cent. on application, 12½ per cent. on allotment, and the balance in instalments not exceeding 25 per cent. at intervals of not less than two months. Subscribers will receive an option to subscribe at par, for two years from the date of allotment, for five 2s. ordinary shares in respect of each £1 stock allotted.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence),* 35, *Old Queen Street, London, S.W.*1. *British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

RADIUM SULPHATE, ETC.—The Director-General, India Store Department, Branch No. 10, Belvedere Road, Lambeth, S.E.1, invites tenders for radium outfit to include 115 mgs. of radium sulphate (August 10), 20,000 gallons saponified cresol, disinfecting fluid (August 17) and 3,360 lb. potassii iodidum B.P. (August 17.)

ICE MAKING PLANT.—A firm of consulting engineers and manufacturers' representatives in Kingston desire to receive copies of illustrated catalogues of this plant and tar macadam. (Reference No. 139.)

DISINFECTANTS.—The New Zealand Government Stores Control Board invites tenders to be presented by November 3, 1926, for the supply of disinfectants for a period of one, two or three years. Firms wishing to offer British made disinfectant can obtain further particulars from the Department of Overseas Trade at Room 51. (Reference B.X. 2734.)

FERRO MANGANESE, TINPLATES AND IRON TUBING.—A firm of iron and steel merchants in Crefeld desire to establish connections with British firms dealing in these. (Reference No. 146.)

CEMENT AND SOYA BEAN OIL.—A Commission Agent in Valparaiso desires to secure the agencies on a commission basis of British manufacturers. (Reference No. 157.)

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House,* 51 *and* 52, *Chancery Lane, London, W.C.*2, *from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to August 28, 1926.

"OMNIPRUF."

469,256. Class 1, a chemical preparation in the nature of paint, for application to wood, metal, fibre-board or cardboard, for the purpose of rendering the same waterproof, acidproof or oilproof. Murphy and Son, Ltd., The Cedars, Sheen Lane, Mortlake, London, S.W.14, technical chemists. April 22, 1926.

"LUXINE."

470,008. For paints and varnishes. Class 1. Craig and Rose, Ltd., 172, Leith Walk, Edinburgh, paint and varnish manufacturers. May 25, 1926.

Tariff Changes

NICARAGUA.—The Nicaraguan *Diario Oficial* for May 22 contains a Decree, effective from date of publication, which provides for the duty-free admission into Nicaragua of chemical and artificial fertilisers (as well as natural manures, which were already duty-free), and of apparatus and chemical substances for killing plant pests, such as cyanide gas, arsenate of calcium, arsenate of lead, arsenate of copper (Paris green).

PORTUGAL.—A Decree (No. 11,873) of July 6 raises a new heading in the Portuguese Customs Tariff for sheets of cellophane (viscoide) for use as a paper substitute, with a duty of 20 centavos per kilog. under the "minimum" tariff and double that amount under the "maximum" tariff.

IRISH FREE STATE.—The Finance Bill, 1926, as introduced into the Free State Parliament embodies the budget resolutions introduced on April 21. In addition to these provisions the Bill provides that sodium carbonate, sodium silicate, caustic soda, potassium carbonate, caustic potash, ammonia and borax, when imported otherwise than as a part or ingredient of any article, shall not be charged with the duty leviable on soap substitutes.

British Association at Oxford

ON the occasion of the meeting of the British Association for the Advancement of Science at Oxford, from August 4 to August 11, the following is the programme of the chemical section: August 5, presidential address by Professor J. F. Thorpe, F.R.S., "The Scope of Organic Chemistry"; Professor J. Backer on "Separation and Racemisation of simple optically active compounds," Professor W. N. Haworth on "Modern Views on the Structure of Disaccharides," and Mr. A. Chaston Chapman, F.R.S. and Dr. H. J. Plenderleith on "An Examination of King Tut-ankh-Amen's Cosmetic"; August 6, joint discussion with the mathematical and physical section on "The Mechanism of Homogeneous Chemical Reactions"; August 9, discussion on "Tautomerism"; August 10, Professor H. ter Meulen on "The Use of Hydrogenation in Organic Analysis," Mr. J. J. Manley on "The Union of Mercury and Helium," Dr. G. Martin on "The Chemistry of Fine Grinding and Fine Powders," and Miss E. S. Semmens on "Hydrolysis by Light Polarised by Small Particles."

Contemplated Tasmanian Carbide Works Sale

THE Premier of Tasmania, Mr. Lyons, has announced that the Tasmanian Government may dispose of the carbide works at Electrona to an English financial group. It is believed that the Government has an excellent chance of obtaining a satisfactory price for the works, and the Ministry will probably be in a position, within a few weeks, to make a further statement on the subject. Whilst these negotiations are in progress inquiries are being made with a view to obtaining further tariff protection for the industry.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

COTY (ENGLAND), LTD., London, W.C., perfume manufacturers. (M., 31/7/26.) Registered July 16, £5,000 and £10,000 land registry charges, to S. A. Ponsonby, 1, Fleet Street, E.C., and others, and Countess Mayo, 30, Montagu Square, W.; charged on 3, Stratford Place, W. *Nil. June 3, 1926.

HEYL'S COLOURS, LTD., Luton. (M., 31/7/26.) Registered July 14, £20,000 second debentures (filed under section 93 (3) of the Companies (Consolidation) Act, 1908), present issue £8,000; general charge. *£15,000. October 26, 1925.

HORTON MANUFACTURING CO., LTD., Rickmansworth, liquid soap manufacturers. (M., 31/7/26.) Registered July 17, £500 second debentures part of £4,000; general charge. *£7,100 debentures £400 mortgage, September 8, 1925.

HULSE (DYES), LTD., Woodlesford. (M., 31/7/26.) Registered July 14, £1,500 first debenture, to Mrs. K. M. Hulse, 26, Sholebrooke View, Harehills, Chapeltown, Leeds; general charge. *Nil. April 14, 1926.

Satisfaction

SERRE (ACHILLE), LTD., London, E., dyers. (M.S., 31/7/26.) Satisfaction registered July 14, all moneys, etc., registered February 6, 1924.

Receiverships

THAMES BANK CHEMICAL WORKS, LTD. C. H. Whatley, of 6 and 7, Charing Cross Chambers, Duke Street, Adelphi, W.C.2, ceased to act as receiver or manager on July 14, 1926.

WOODS AND WEBB, LTD. (R., 31/7/26.) J. Braithwaite, of Chichester House, Chancery Lane, W.C., was appointed receiver on July 10, 1926, under powers contained in instrument dated February 6, 1923.

London Gazette, &c.

Winding Up Petition

CALUMITE LEAD PRODUCTS CO., LTD. (W.U.P., 31/7/26.) A petition has been presented for the winding up of the company by the Court.

Notices of Dividends

BOOTH, Thomas Arthur, Louisa Street, Idle, Bradford, wholesale manufacturing druggist. First dividend, 3s. per £, payable August 3, Palmerston Buildings, 5, Manor Row, Bradford.

MARSDEN, Edward, Bowling Soap Works, Sticker Lane, Bradford, trading as P. and E. Marsden, soap boiler and manufacturing chemist. Supplemental dividend, 2s. 10½d. per £, payable August 4, Official Receiver's Office, 12, Duke Street, Bradford.

Partnerships Dissolved

ESTEROL MANUFACTURING CO. AND H. C. BARNETT AND CO. (Henry Charles BARNETT and John Bright GREGORY), chemical and colour manufacturers, Ferdinand Street Works, Ferdinand Street, Oldham Road, Manchester, by mutual consent as from May 1, 1926. Debts received and paid by H. C. Barnett.

New Companies Registered

INNOVATIONS DEVELOPMENT AND TRADING CO., LTD., 6, South Square, Grays Inn, London. Registered July 23, 1926. Manufacturers of and dealers in chemical products, etc. Nominal capital, £10,000 in £1 shares.

THE LOKRIS NICKEL CO., LTD. Registered July 26, 1926. To acquire mines in Greece, and to explore, develop and maintain, nickel, iron, chrome, copper, coal and other mines, properties and works, etc. Nominal capital, £770,000 in 725,000 participating preferred shares of £1 each and 900,000 deferred shares of 1s. each. Solicitors: Holmes, Son and Pott, Capel House, New Broad Street, London.

THE UNITED ALKALI ESTATES, LTD. Registered July 26, 1926. To construct, furnish, etc., buildings and erections of all kinds; to promote and manage garden cities, suburbs and villages and building schemes of all kinds. Nominal capital, £10,000 in £1 shares. Solicitor: M. A. M. Dillon, 14, Water Street, Liverpool. The first directors shall be appointed by the United Alkali Co., Ltd.

New British Standard Specifications

THE British Engineering Standards Association has just issued British Standard Specifications for zinc oxide (Types 1 and 2) for paints, asbestine for paints, interior oil varnish, exterior oil varnish, and flatting or rubbing oil varnish. They contain clauses regulating the composition, together with standard reception tests, for the purchase of zinc oxide, asbestine, interior, exterior and platting or rubbing oil varnish and appendices giving methods of carrying out the tests. These specifications have been prepared at the request of the paint manufacturers by a committee representative of both the buying and manufacturing interests, and as in the case of all British Standard Specifications, they will be reviewed as experience of their working or progress in the industry renders it necessary, and revised issues will be published from time to time. Copies of these five new specifications (Nos. 254, 255, 256, 257, and 258—1926) can be obtained from the B.E.S.A. Publications Department, 28, Victoria Street, London, S.W.1, price 1s. 2d. each, post free. Amongst the specifications that have already been issued are those for genuine dry White Lead (No. 239, 1926) and genuine White Lead Oil Paste (No. 241, 1926).

New Arsenic Test

PROFESSOR BILLETER, of the University of Neuchatel, is said to have found a new test by which the smallest traces of arsenic in the human body can be detected within a few minutes. He declares that the body of a normal healthy person contains from five to seven milligrammes of arsenic introduced into the system through food, especially vegetables, and says that while this amount is necessary to the general health of a person, a larger quantity is harmful. This statement will probably be contested, as it is known by doctors that Alpine guides and villagers living in the mountainous districts of Europe swallow ten times as much arsenic without harm and with apparent benefit. Arsenic counteracts the bad effects of rarefied air on the heart and lungs, and during long climbs aids the body to resist physical fatigue, while at the same time it prevents " mountain sickness " in high altitudes. The new test, the professor claims, in the case of murder or suicide, would rapidly register the exact quantity of arsenic in a body and would be of great assistance to doctors in an autopsy.

C.W.S. Soap Developments

THE opening of the Co-operative Wholesale Society's new soap works at Irlam marks an important addition to the Society's soap manufacturing activities. The new building, which adjoins the old soap works opened in 1895, is the joint product of the C.W.S. building and architectural departments. Since the Society started manufacturing soap in 1874, a weekly output of seven tons has grown to one of 900 tons per week, and the new works will bring this total up to 1,400 tons per week; while the total number of operatives, when the whole of the new works come into operation, will be 1,600, an increase of 500.